# SECTION 15130 STAINLESS STEEL PIPING (CERTIFIED) FOR ACTIVATED COOLING WATER SYSTEMS

#### PART 1 - GENERAL

#### 1.1 SUMMARY

- A. Section includes: High quality stainless steel piping systems with materials, construction, and inspection requirements that exceed standard industrial practices. It is intended for activated cooling water services.
- B. Items denoted as Government Furnished Equipment (GFE) are identified accordingly and as such are not purchased by the contractor. Installation of these components is the responsibility of the contractor installing the piping.
- C. Construction activity requirements for cleanliness, quality, and material traceability are higher than normal.
- D. Inspection required, especially of welded joints, is extremely high for these systems.
- E. This specification is applicable to piping with design pressures of 0 psig through 250 psig and a temperature range of 32°F to 200°F.
- F. Install this piping system per general requirements of Section 15050 and specific requirements as outlined below.

#### 1.2 RELATED SECTIONS

- A. Section 15050, Pipe Systems
- B. Section 15074, Identification of Piping Systems.
- C. Section 15130, Attachment A, Pressure/Leak Testing Activated Cooling Water Systems
- D. Section 15130, Attachment B, Cleaning Requirements Activated Cooling Water Systems
- E. Section 18100A, General Welding Requirements Target Building and Beam Dump Bldgs
- F. Section 15130, Attachment C, Equipment Listing Activated Cooling Water Systems
- G. Section 15130, Attachment D, Data Sheets Activated Cooling Water Systems

#### 1.3 REFERENCES

- A. ANSI B31.3-93, Chemical Plant and Petroleum Refinery Piping.
- B. ANSI B18.2.1, Square and Hex Bolts and Screws
- C. ANSI B18.2.2, Square and Hex Nuts
- D. ASTM A 380-94, Standard Practices for Cleaning and Descaling Stainless Steel Parts, Equipment, and Systems.
- E. ASME B16.5A, Dimensional Standards for Steel Pipe Flanges and Flanged Fittings.

- F. ASME B16.25, Buttwelding Ends
- G. ASME 36.19M, Stainless Steel Pipe
- H. ASME SA 182," Specification for forged or rolled alloy Steel Pipe Flanges, Forged Fittings, and Valves and Parts for High Temperature Service"
- I. ASME SA 312," Specification for Seamless and Welded Austenitic Stainless Steel Pipes"
- J. ASME A 403," Specification for Wrought Austenitic Stainless Steel Piping Fittings"
- K. ASME SA-479, "Specifications for Stainless and Heat Resisting Steel Bars and Shapes for Use in Boilers and Other Pressure Vessels".
- L. Federal Standard 183C (FED-STD-183C), Continuous Identification Marking of Iron and Steel Products.
- M. ASTM A269, "Standard Specification for Seamless and Welded Austenitic Stainless Steel Tubing for General Service"
- N. MIL-STD-1246C, "Product Cleanness Levels and Contamination Control Program".

#### 1.4 SUBMITTALS

- A. Submit for approval a Cleaning Plan based on the requirements set forth in the example plan of Attachment B.
- B. Submit for approval certified documentation of proposed Bending Process.
- C. Submit for approval fully detailed, certified, fabrication drawings. Shop welds shall be located and identified (numbered) and welder that performed each weld shall be identified.

#### 1.5 QUALITY ASSURANCE

A. Welding shall be in accordance with Division 18, Section 18100A.

#### PART 2 - PRODUCTS

#### 2.1 MATERIALS

Materials used for construction of section 15130 systems require special controls and documentation. Listed below are the acceptable materials for use in this service. Materials listed GFE (Government Furnished Equipment) will be supplied by Construction Manager (CM). Control and storage requirements for GFE are addressed in Division 1.

The Manufacturer's Certified Test Reports (CMTRs) and the manufacturer's certification of solution anneal at a minimum temperature of 1900 deg F (all completely traceable via heat numbers and material markings) shall be submitted to the CM for approval prior to use of material in fabrication.

Every bolt and nut shall have the proper grade identification mark or insignia.

A. Equipment Data Sheets (Attached)

<u>Data Sheet</u>	<u>Title</u>
106060000-DS-A001-R00	Pressure Safety/Relief Valve (RV-XXX)
106060000-DS-A002-R00	Rupture Discs (RD-XXX)
106060000-DS-A003-R00	Globe Valves – $3/4$ " and smaller (HV-XXX)
106060000-DS-A004-R00	Check Valves – (CV-9XXX)
106060000-DS-A005-R00	Flex Hoses - (FH-9XXX)

# B. Equipment Specifications (GFE)

106060000-EQ-0001-R00	Fabricated Tanks and Pressure Vessels (Drain Tanks)
106060000-EQ-0002-R00	Bulk Shielding Liner Double-Walled Drain Pipe
106060000-EQ-0003-R00	Globe Valves – Manual, Auto On/Off and Flow Control
106060000-EQ-0004-R00	Fabricated Tanks and Pressure Vessels (Delay Tanks and Gas/Liquid Separator Tanks)
106060000-EQ-0005-R00	Ion Exchange Columns
106060000-EQ-0006-R00	Activated Cooling Water Filters
106060000-EQ-0007-R00	Recirculation Pumps
106060000-EQ-0008-R00	Heat Exchangers
106060000-EQ-0009-R00	Condenser

# C. Piping/Tubing Components

Pipe	ASME SA-312	Grade TP 316L, Seamless, Sch 40			
Tube	ASTM A-269 Annealed	Grade TP 316L, Seamless Cold Drawn and			
Flanges	ASME SA -182	Grade F 316L, raised-face, weldneck, spiral Serrated face with 125-250 micro-inch RMS finish			
Bolts	ASME SA -193	Class 2, Grade B8, Strain Hardened			
Nuts	ASME SA -194	Grade 8F, Strain Hardened			
Plate	ASME SA -240	Type 316L			
Bars and Forged Billets	ASME SA- 479	Type 316L			
Weld Electrodes	See Specification 1	8100			
Fittings	ASME SA- 403	Grade WP-S Type 316L			
Gaskets	Flexitallic 304 stainless steel, carbon graphite filled spiral wound metal gasket; Flexitallic, Model No. CGI, or equal as a minimum.				

with inner ring I.D. equal to pipe I.D. for all flanged joints.

#### 2.2 FABRICATION

- A. Maintain identification on pipe, bar and plate materials during fabrication for traceability.

  Transfer pipe, bar and plate markings, Purchase Order number, and heat number by electroetching onto pipe, bar or plate to be cut prior to cutting to ensure traceability.
- B. Maintain materials in clean condition throughout fabrication process to preclude large scale recleaning of materials. Perform additional cleaning required as part of fabrication process.
- C. Exercise controls during fabrication of stainless steel equipment to minimize exposure of metal to contaminants, particularly halides that cause stress-corrosion cracking and pitting corrosion. If halide-bearing compounds are used, remove them by cleaning equipment after fabrication.
- D. Solid compounds or markers that contact stainless steel surfaces shall contain no more than 250 PPM of weight of halides and shall not be water-soluble.

### E. Bending

- 1. Bending should not be required except as indicated on drawings.
- 2. Make bends per flattening and thinning requirements of ANSI B31.3.
- 3. Use cold bending process only.

#### F. Cutting/Grinding

- 1. Cut pipe by sawing, shearing, machining, plasma cutting, or grinding.
- 2. Grind cut edges that are not to be welded to eliminate shear cracks and gouges and to produce a clean, bright surface.
- 3. Overlay pipe and sheet ends identified on drawings with weld material to cover exposed end grain of metal for corrosion-resistance purposes.
- 4. All wire brushes shall be made of stainless steel. Grinding wheels shall be new or previously used only on stainless steel. Localized rust or stain spots resulting from high-speed brushing shall be cleaned using hand brushing. All wire brushes and grinding wheels for use on stainless steel shall be uniquely identified.

#### G. Bolted Joints

- All bolts on specification 15130 flanges shall be torqued, using a calibrated torque wrench, in accordance with the requirements of ANSI B31.3. The Subcontractor shall submit a bolting procedure to the CM for approval prior to fabrication. Torquing shall be accomplished in incremental steps using a pattern of tightening which does not distort the flanges.
- H. Welding: Perform welding in accordance with Sect. 18100A and as follows:
  - 1. Reclean surfaces to be welded per 3.4.
  - 2. Use GTAW process with argon backing to weld piping. Use an oxygen analyzer to ensure that less than 1 % oxygen is in purge. Back purge is required to 3/16-in. thickness minimum.
  - 3. Do not use welding backing rings, strips, or consumable inserts.
  - 4. Create and maintain pipe weld map(s) to accurately locate and identify each pipe system weld and record symbol of welder. Use a unique weld identification number on weld map to correspond to radiographic record(s) for that weld. The weld map and associated weld reports shall be submitted by the Subcontractor to the CM prior to delivery of the piping systems.
  - 5. All spec. 15130 flanges are to be welded in place while bolted to the mating flange with a 1/8" thick stainless steel plate in place of the flange gasket.

#### 2.3 SOURCE QUALITY CONTROL

- A. Bending Process Certification
- B. Base bending process certification data on a minimum of three sample bends of each pipe size bend made by each piece of production equipment.
- C. Inspect sample bends with liquid penetrant for cracking.
- D. Section and measure sample bends to demonstrate compliance with ANSI B31.3.

#### 2.4 FITTINGS

- A. Pipe fittings for systems designed under this specification shall be constructed in accordance with the following standard:
  - Elbows and Reducers Fittings shall conform to the requirements set forth in ASME A-403 "Specification for Wrought Austenitic Stainless Steel Piping Fittings"

#### 2.5 VALVES

- A. Globe Valves 3/4" and smaller (See equipment specification 10606000 EQ000X for globe valves larger than 3/4")
  - Globe valves shall conform to the requirements set forth in the attached data sheet DS-15130X
  - 2. Globe valve installation shall be in accordance with the requirements set forth in 15100.

#### B. Check Valves

- Check valves shall conform to the requirements set forth in the attached data sheet DS-15130X
- 2. Check valve installation shall be in accordance with the requirements set forth in section.

#### C. Relief Valves/Rupture Disks

- Relief valves and Rupture Disks shall conform to the requirements set forth in the attached data sheet DS-15130X and DS-15130XX
- 2. Relief valve and Rupture Disk installation shall be in accordance with the requirements set forth in section 15100.

#### 2.6 FLEX HOSES

- A. Flex Hoses shall conform to the requirements set forth in the attached data sheet DS-15130X
- B. Flex Hose installation shall be in accordance with the requirements set forth in section 3.1 of this specification

#### PART 3 - EXECUTION

#### 3.1 INSTALLATION

A. The activated cooling water piping will be installed under the supervision of the CM in addition to the minimum requirements specified in the construction specification. Installation shall be in accordance with ANSI B31.3 and general requirements set forth in Sect. 15050.

B. Identification shall be maintained on all materials during fabrication and installation for traceability. Material markings, IR number, and heat number shall be transferred by electroetching onto any length of material to be cut prior to cutting to ensure traceability.

#### C. Contamination Control

General

All piping material will be delivered by the Subcontractor in a clean condition and sealed for protection from contamination. The Subcontractor shall maintain the pipe in the clean condition throughout the installation process to preclude large scale recleaning of the materials. The Subcontractor shall be responsible for any additional cleaning required as part of the installation process.

Controls shall be exercised during all stages of stainless steel equipment installation to prevent exposure of the metal to contaminants, particularly halides. The Subcontractor shall handle and perform work on stainless steel in accordance with ASTM A-380 to minimize the potential for iron contamination. Any solid compounds or markers that contract the stainless steel surfaces of the equipment shall be low-halide type (< 250 micro-grams/gram) and shall be free of water -soluble halides. Any lubricants to be used in the pipe end prep process shall be free of water-soluble halides (< 50 micro-grams/gram) and shall be approved by the CM prior to the start of fabrication.

#### 3.2 REPAIR/RESTORATION

A. Repair defective welds in accordance with Div 18100A. Inspect and re-examine repaired welds. Defective material shall not be repaired by welding.

#### 3.3 FIELD QUALITY CONTROL - TESTING & EXAMINATION

- A. Pressure/Leak Test: Test piping in accordance with Attachment A.
- B. Bends: Examine bends in pipe and tubing per 100% liquid-penetrant examination requirements of Section 18100A.
- C. Welds: Examine Welds in pipe and tubing per Sect. 18100A.

#### 3.4 PRE-CLEANING

- A. Clean Type 316L stainless steel in a manner that does not introduce halides to pipe surface (inside of outside) and which provides a clean interior surface, free of oils, cutting fluids, nitrides, oxides, carbides, dirt, dust, and moisture. Only demineralized or distilled water with resistively greater than 1.5 Mohm-cm, denatured ethyl alcohol or other CM approved solvent may be used.
- B. Clean stainless steel piping materials prior to welding operations and after cutting of pipe.
- C. Reclean piping materials prior to welding if an intermediate operation is performed after cleaning, including cutting, grinding, pervious welds, or other operations in which seal is removed and pipe interior is contaminated.
- D. Hand wipe exterior and interior surfaces 1 in. back from weld face with solvent-wetted cloths. Change cloths frequently. Stop wiping when cloth remains clean.
- E. Use lint-free cloth swabs to dry pipe, fittings, and valves. Change swabs frequently. Stop

drying when swabs come out clean and dry.

- F. Use hand brushing to clean localized rust or stain spots resulting from high-speed brushing.
- G. Follow the cleaning procedures and guidelines identified in specification section 15130 Attachment B

# 3.5 TESTING AND EXAMINATION

- A. Pressure/Leak Testing: Test piping systems in accordance with Attachment A.
- B. Welds

See Division 18 for weld examination requirements.

#### 3.6 SPECIAL REQUIREMENTS FOR TANK VAULT PIPING

- A. The following recommended method or an alternative approved by the CM shall be used to leak test the piping connected to all tanks.
- B. Plug one pipe end at the tank nozzle. Close the valve nearest the tank for the pipe being tested. Test the pipe in accordance with Section 3.5.

#### **END OF SECTION 15130**

# **ATTACHMENT A**

#### PRESSURE AND LEAK TESTING

(NOT TO BE INCLUDED WITH THE 75% ISSUE)

# **ATTACHMENT B**

#### **CLEANING PROCEDURES**

(SYSTEM CLEANING IS NOT INCLUDED AS PART OF THE 75% ISSUE)

# **ATTACHMENT C**

**EQUIPMENT LISTING** 

1.1 SNS	Activated Water Loops Equipment List
2Vessels	
SEP-1020	Mercury Exchanger Cooling Loop Gas/Liquid Separator
SEP-1500	Target Shroud/Proton Beam Window Cooling Loop Gas/Liquid Separator
SEP-2000	Moderators/Shutters/Inserts Cooling Loop Gas/Liquid Separator
SEP-2500	Reflector Plugs Cooling Loop Gas/Liquid Separator
SEP-9300	Ring Injection Beam Stop Cooling Loop Gas/Liquid Separator
TK-1030	Mercury Exchanger Cooling Loop Drain Tank
TK-1510	Target Shroud/Proton Beam Window Cooling Loop Drain Tank
TK-1510	Target Shroud Cooling Loop Delay Tank
TK-1512	Proton Beam Window Cooling Loop Delay Tank
TK-2010	Moderators/Shutters/Inserts Cooling Loop Drain Tank
TK-2011	Moderators/Shutters/Inserts Cooling Loop Delay Tank
TK-2510	Reflector Plugs Cooling Loop Drain Tank
TK-2511	Reflector Plugs Cooling Loop Delay Tank
TK-9310	Ring Injection Beam Stop Cooling Loop Drain Tank
TK-9311	Ring Injection Beam Stop Cooling Loop Delay Tank
111 0011	Traing injustion boarn otop occaming body rains
3Heat Exchar	ngers
HX-1050	Mercury Exchanger Cooling Loop Cooler
HX-1530	Target Shroud/Proton Beam Window Cooling Loop Cooler
HX-1531	Target Shroud/Proton Beam Window Offgas Water Condenser
HX-2041	Moderators/Shutters/Inserts Cooling Loop Cooler
HX-2541	Reflector Plugs Cooling Loop Cooler
HX-2542	Reflector Plugs Offgas Water Condenser
HX-9320	Ring Injection Beam Stop Cooling Loop Cooler
HX-9321	Ring Injection Beam Stop Offgas Water Condenser
EHTR-	Moderators/Shutters/Inserts Cooling Loop Trim Heater
2040	
40	
4Pumps	Maraum Fuch as sear Cooling Loop Duran
P-1000A	Mercury Exchanger Cooling Loop Pump
P-1000B	Mercury Exchanger Cooling Loop Pump
P-1520A	Target Shroud/Proton Beam Window Cooling Loop Pump
P-1520B	Target Shroud/Proton Beam Window Cooling Loop Pump
P-2030A	Moderators/Shutters/Inserts Cooling Loop Pump
P-2030B	Moderators/Shutters/Inserts Cooling Loop Pump
P-2530A	Reflector Plugs Cooling Loop Pump
P-2530B	Reflector Plugs Cooling Loop Pump
P-9330A	Ring Injection Beam Stop Cooling Loop Pump
P-9330B	Ring Injection Beam Stop Cooling Loop Pump
P-2532	Reflector Plugs Cooling Loop Heavy Water Makeup Drum Pump

5Ion Exchange Columns IX-1040A Mercury Exchanger Cooling Loop Ion Exchange Column
<u> </u>
IX-1040B Mercury Exchanger Cooling Loop Ion Exchange Column
IX-1550A Target Shroud/Proton Beam Window Cooling Loop Ion Exchange Column
IX-1550B Target Shroud/Proton Beam Window Cooling Loop Ion Exchange Column
IX-2020A Moderators/Shutters/Inserts Cooling Loop Ion Exchange Column
IX-2020B Moderators/Shutters/Inserts Cooling Loop Ion Exchange Column
IX-2560A Reflector Plugs Cooling Loop Ion Exchange Column
IX-2560B Reflector Plugs Cooling Loop Ion Exchange Column
IX-9350A Ring Injection Beam Stop Cooling Loop Ion Exchange Column
IX-9350B Ring Injection Beam Stop Cooling Loop Ion Exchange Column
6Filters
FLT-1010 Mercury Exchanger Cooling Loop Pre-filter
FLT-1011 Mercury Exchanger Cooling Loop After-filter
FLT-1540 Target Shroud/Proton Beam Window Cooling Loop Pre-filter
FLT-1541 Target Shroud/Proton Beam Window Cooling Loop After-filter
FLT-2050 Moderators/Shutters/Inserts Cooling Loop Pre-filter
FLT-2051 Moderators/Shutters/Inserts Cooling Loop After-filter
FLT-2520 Reflector Plugs Cooling Loop Pre-filter
FLT-2521 Reflector Plugs Cooling Loop After-filter
FLT-9340 Ring Injection Beam Stop Cooling Loop Pre-filter
FLT-9341 Ring Injection Beam Stop Cooling Loop After-filter
701
7Samplers Marcury Evolution Cooling Loop Sample Band
Mercury Exchanger Cooling Loop Sample Panel Target Shroud/Proton Beam Window Cooling Loop Sample Panel
Moderators/Shutters/Inserts Cooling Loop Sample Panel
Reflector Plugs Cooling Loop Sample Panel
Ring Injection Beam Stop Cooling Loop Sample Panel
Tring injection beam stop cooling Loop Sample Failel

# Valve Summary Tables-Activated Water Loops (15130)

Table 1 Manual Valves

Size	3/4"	1"	1-1/2"		2"		3"	4"	6"
	HV-2097	HV-1034	HV-1039	HV-2172	HV-1010	HV-2510	HV-1511	HV-1004	HV-1006
	HV-2098	HV-1035	HV-1044	HV-2173	HV-1011	HV-2511	HV-1512	HV-1005	HV-1007
	HV-2099	HV-1038	HV-1515	HV-2174	HV-1012	HV-2512	HV-2155	HV-2504	HV-2550
ļ	HV-2100 HV-2101	HV-1045 HV-1081	HV-1516 HV-1517	HV-2175 HV-2176	HV-1013 HV-1016	HV-2513 HV-2514	HV-2156 HV-2505		HV-2551
	HV-2101	HV-1082	HV-1518	HV-2177	HV-1017	HV-2515	HV-2506		
	HV-2103	HV-1083	HV-1519	HV-2178	HV-1018	HV-2554	HV-9304		
1	HV-2104	HV-1099	HV-1520	HV-2179	HV-1019	HV-2555	HV-9307		
	HV-2105	HV-1100	HV-1521	HV-2180	HV-1020	HV-2556	HV-9309		
Valve	HV-2106	HV-1101	HV-1522	HV-2181	HV-1021	HV-2559	HV-9310		
1	HV-2107	HV-1278	HV-1523	HV-2183	HV-1022	HV-2560			
Tag	HV-2108	HV-1545	HV-1524	HV-2202	HV-1023	HV-2561			
1	HV-2109	HV-1594	HV-1525	HV-2507	HV-1024	HV-2562			
Number	HV-2110	HV-1595	HV-1526	HV-2508	HV-1025	HV-2563			
ļ	HV-2111 HV-2112	HV-1596 HV-1597	HV-1527 HV-1528	HV-2509 HV-2594	HV-1026 HV-1027	HV-2564 HV-2565			
	HV-2113	HV-1800	HV-1529	HV-9313	HV-1027	HV-2566			
	HV-2114	HV-1810	HV-1530	HV-9314	HV-1029	HV-2567			
	HV-2132	HV-1816	HV-1531	HV-9315	HV-1030	HV-2568			
	HV-2133	HV-1817	HV-1532	HV-9316	HV-1031	HV-2569			
1	HV-2134	HV-2162	HV-1533	HV-9319	HV-1032	HV-2570			
	HV-2135	HV-2163	HV-1534	HV-9320	HV-1033	HV-2571			
	HV-2136	HV-2203	HV-1535	HV-9321	HV-1037	HV-2572			
	HV-2137	HV-2279	HV-1536	HV-9322	HV-1504	HV-2573			
	HV-2138	HV-2280	HV-1544	HV-9323	HV-1507	HV-2574			
	HV-2139	HV-2281	HV-2004 HV-2005	HV-9324 HV-9325	HV-1508	HV-2575			
ļ	HV-2140 HV-2141	HV-2282 HV-2302	HV-2005	HV-9326	HV-1537 HV-1538	HV-2576 HV-2577			
	HV-2142	HV-2586	HV-2159	HV-9327	HV-1539	HV-2578			
ļ	HV-2143	HV-2588	HV-2160	HV-9328	HV-2195	HV-2579			
ļ	HV-2144	HV-2589	HV-2161	HV-9329	HV-2196	HV-2580			
ļ	HV-2145	HV-2599	HV-2164	HV-9330	HV-2197	HV-2585			
1	HV-2146	HV-2623	HV-2165	HV-9331	HV-2287				
	HV-2147	HV-2624	HV-2166	HV-9332					
	HV-2148	HV-2625	HV-2167	HV-9333					
	HV-2149	HV-2626	HV-2168	HV-9334					
ļ	HV-2150 FCV-2115	HV-2901 HV-9305	HV-2169 HV-2170	HV-9335 HV-9336					
	FCV-2116	HV-9306	HV-2170	HV-9343					
	FCV-2117	HV-9337	111 2171	117 3040					
	FCV-2118	HV-9338							
	FCV-2119	HV-9339							
	FCV-2120	HV-9378							
	FCV-2121	HV-9379							
	FCV-2122	HV-9380							
	FCV-2123	HV-9381							
	FCV-2124 FCV-2125	HV-9386							
	FCV-2125 FCV-2126	HV-9387 HV-9579							
	FCV-2120	HV-9589							
	FCV-2128	110 3303							
	FCV-2129								
	FCV-2130								
	FCV-2131								
	FCV-2132								
Quantity	55	50	7	8	6	5	10	3	4

Table 2 Remotely Operated Manual Valves

Size	1"	1-1/2"	2"	3"	4"
Valve	XV-9306	XV-2528	XV-1506	XV-2525	XV-2526
Tag			XV-1510	XV-2527	
Number				XV-9307	
Quantity	1	1	2	3	1

Table 3 Control Valves

Size	1"	Fail	1-1/2"	Fail	2"	Fail	3"	Fail	6"	Fail
	HCV-	Last	HCV-1543	Last	HCV-1043	Last	HCV-9341	Last	HCV-1041	Last
Valve	9342	Last	HCV-2041	Last	HCV-1541	Last				
	HCV-		HCV-2043	Last	HCV-1542	Last				
Tag	1544		HCV-2044	Last	HCV-2542A	Last				
Ni. una la a u			HCV-2541	Last	HCV-2542B	Last				
Number			HCV-2542C	Last	HCV-2543A	Last				
			HCV-2542D	Last	HCV-2543B	Last				
			HCV-9343	Last	HCV-2543C	Last				
					HCV-2543D	Last				
					HCV-2544	Last				
Quantity	2		8		10		1		1	

Table 4 Actuated Shutoff Valves

Size	1"	Fail	1-1/2"	Fail	2"	Fail	3"	Fail	6"	Fail
	SV-1041	Close	SV-1040	Close	SV-1771	Open	SV-1501	Open	SV-1003	Open
	SV-1271	Open	SV-1541	Close	SV-1772	Open	SV-1503	Open	SV-1008	Open
	SV-1272	Open	SV-1774	Close	SV-1773	Open	SV-1513	Open	SV-1009	Open
	SV-1273	Open	SV-1775	Close	SV-2001	Open	SV-1514	Open	SV-1042	Open
	SV-9571	Open	SV-1776	Close	SV-2003	Open	SV-1780	Close	SV-2501	Open
Valve	SV-9572	Open	SV-1777	Close	SV-2157	Open	SV-9301	Open	SV-2503	Open
	SV-9573	Open	SV-1778	Close	SV-2158	Open	SV-9303	Open	SV-2552	Open
Tag		-	SV-1779	Close	SV-2271	Close	SV-9311	Open	SV-2553	Open
			SV-2199	Close	SV-2272	Close	SV-9312	Open	SV-2782	Close
Number			SV-2276	Close	SV-2273	Close	SV-9576	Close		
			SV-2277	Close	SV-2274	Close				
			SV-2598	Close	SV-2275	Close				
			SV-2779	Close	SV-2278	Close				
			SV-2900	Open	SV-2300	Open				
			SV-9377	Close	SV-2301	Open				
			SV-9574	Close	SV-2582	Close				
			SV-9575	Close	SV-2773	Open				
			SV-9577	Close	SV-2774	Open				
			SV-9578	Close	SV-2775	Open				
					SV-2776	Close				
					SV-2777	Close				
					SV-2778	Close				
Quantity	7		19		22		10		9	

Table 5 Check Valves

Size	1"	1-1/2"	2"	3"	4"
	CKV-1036	CKV-1043	CKV-1505	CKV-1500	CKV-1000
Valve	CKV-2597	CKV-1543	CKV-1540	CKV-1502	CKV-1002
Tag	CKV-9340	CKV-2201	CKV-2000	CKV-1509	CKV-2500
Number		CKV-9342	CKV-2002	CKV-2154	CKV-2502
			CKV-2198	CKV-9300	CKV-2549
			CKV-2581	CKV-9302	
			CKV-2584	CKV-9308	
Quantity	3	4	7	7	5

Table 6 Instrumentation Valves (Partial List)

Size			1/2"		
	HV-1084	HV-1599	HV-2308	HV-2915	HV-9584
	HV-1085	HV-1812	HV-2309	HV-2916	HV-9590
Valve	HV-1284	HV-1813	HV-2310	HV-2917	HV-9591
Tag	HV-1285	HV-1814	HV-2311	HV-2922	HV-9592
Number	HV-1286	HV-1815	HV-2312	HV-2923	HV-9593
- ramson	HV-1287	HV-1818	HV-2313	HV-2924	HV-9596
	HV-1288	HV-1819	HV-2314	HV-2925	HV-9597
	HV-1289	HV-1820	HV-2315	HV-9353	HV-9598
	HV-1290	HV-1821	HV-2627	HV-9373	HV-9599
	HV-1291	HV-2283	HV-2628	HV-9382	
	HV-1598	HV-2284	HV-2914	HV-9383	
Quantity	·		53		

# **ATTACHMENT D**

**EQUIPMENT DATA SHEETS** 

Tag No.: RV	-1300 Mercury Exchanger Feed	A. Quantity Required: ONE					
Applicable Code: ASME Section VIII Division 1							
T.	☐ Safety	Relief	<b>⊠</b> Safety Relief				
Type	☐ Conventional	<b>⊠</b> Balanced Be	llows Pilot Operated				
	⊠ Flanged	<b></b> Screwed					
Connections	Flange Rating: 1 Ra	.50 FI	ange Facing: Raised Face 125-250				
	Line Size: Inlet/Outlet	/	inches				
PEGIGIA GOV	TO THE COLUMN THE COLUMN TO TH						
DESIGN CON Set Pressure: HOI		Max Operating	Pressure HOLD PSIG				
	Operating 87 Flowing 87		tions Inlet/Outlet: /				
Static Back Pressure:	· · · · · · · · · · · · · · · · · · ·	Built-up Back Pressure: HOLD PSIG					
	150 PSIG	Allowable Overpressure: 10%					
Service: Static	Cyclic	Installed Downstream of Rupture Disc: ☐Yes ☐No					
Fluid: Water Liquid	☐ Gas ⊠	MW: 18.0152 C <sub>p</sub> /C <sub>v</sub> : 1.329					
Capacity Required:	200,000 lb/hr	Density: 62.1	5 lb/ft <sup>3</sup> Viscosity: 0.788				
Orifice: Calculated A	rea, in <sup>2</sup> : Selected Are	rea, in <sup>2</sup> : Orifice Designation:					
Design Basis: Block	ed Flow						
A TT A CLIMEN	NTC / ACCECCODIEC						
Cap: Screwed	NTS / ACCESSORIES  Bolted	Lever: Pla	in Packed				
σαρ. 🖂 σοισweα	Dolled	Lovei.	III LIONGO				
7.2 Test Gag  Jacket Bolt-or	Field Test Connection  Integral Jacket Fluid:		ter sign P: PSIG Design T:				
°F							
MATERIALS	OF CONSTRUCTION						
<b>Body:</b> 316 SS		Bonnet: 316	SS				
Nozzle: 316 SS		<b>Disc</b> : 316 SS					
Guide: 316 SS		Bellows: 316					
Resilient Seats:		<b>Spring</b> : 316 \$					
Gaskets:		Flanges: 316	SS				
DOCUMENT	ATION						

With Bids

Certified

Approval

Operation & Performance Data	2	2
Literature & Parts List	2	2
Operating & Maintenance Instructions		2
Installation Instructions		2
Test & Inspection Reports		2
Material Certifications (CMTRs)		2
Code Certificate of Compliance		2
NOTES:	·	•

Tag No.: RV-1500 Target Shroud Feed		Α.	Quantity Required: ONE	
Applicable Co	ode: ASME Section VIII Division	1		
	☐ Safety	☐ Relief	⊠ Sat	fety Relief
Type			Surety Rener	
	☐ Conventional	<b>⊠</b> Balanced Be	llows P	ilot Operated
	⊠ Flanged	Screwed		
Connections	Flange Rating: 1 Ra	.50 F	ange Facing:	Raised Face 125-250
	Line Size: Inlet/Outlet	1	inches	
DESIGN CON	IDITIONS			
Set Pressure: HOI		Max Operating	Pressure	HOLD PSIG
	Operating 92 Flowing 92	Vacuum Condi		
Static Back Pressure	· · · · · · · · · · · · · · · · · · ·	Built-up Back F		IOLD PSIG
Vessel MAWP: 52.8 PSIG Allowable Overpressure: 10%			)%	
Service: Static	· · · · · · · · · · · · · · · · · · ·			oture Disc:  Yes
Fluid: Water Liquid	☐ Gas ⊠	MW: 18.0 1.329	152	C <sub>p</sub> /C <sub>v</sub> :
Capacity Required: 25,000 lb/hr Density: 62.09 lb/ft <sup>3</sup> Viscosity: 0.744 cP				Viscosity: 0.744
Orifice: Calculated A	rea, in <sup>2</sup> : Selected Are	ea, in²:	Orifice Des	ignation:
Design Basis: Block	ed Flow			
A TETT A CIVIN (TEX	TEG / A COEGGODIEG			
	NTS / ACCESSORIES  Bolted	Lever: Pla	ain 🗌 Pack	vod.
Cap: Screwed	Boiled	Lever: L Pla	IIII L Pack	Red
7.3 Test Gag	☐ Field Test Connection	n 🔲 Pilot Fil	ter	
☐ Jacket ☐ Bolt-or °F	n 🗌 Integral Jacket Fluid:	De	sign P:	PSIG Design T:
MATERIALS	OF CONSTRUCTION			
<b>Body:</b> 316 SS		Bonnet: 316	SS	
Nozzle: 316 SS		<b>Disc</b> : 316 SS		
Guide: 316 SS Bellows: 316 SS				
Resilient Seats:		<b>Spring:</b> 316 \$	SS	
Gaskets:		Flanges: 316	SS	
DOCUMENT	ATION			

With Bids

Certified

Approval

Operation & Performance Data	2	2
Literature & Parts List	2	2
Operating & Maintenance Instructions		2
Installation Instructions		2
Test & Inspection Reports		2
Material Certifications (CMTRs)		2
Code Certificate of Compliance		2
NOTES:		

Tag No.: RV-1501 Proton Beam Window Feed		Α.	Quantity Required: ONE	
Applicable Co	ode: ASME Section VIII Division	1		
	☐ Safety	Relief	⊠ Sat	fety Relief
Туре	Sureey		Surety Rener	
	☐ Conventional	<b>⊠</b> Balanced Be	llows P	ilot Operated
	⊠ Flanged	Screwed		
Connections	Flange Rating: 1 Ra	50 F	ange Facing:	Raised Face 125-250
	Line Size: Inlet/Outlet	1	inches	
DESIGN CON	IDITIONS			
Set Pressure: HOI		Max Operating	Pressure	HOLD PSIG
	Operating 92 Flowing 92	Vacuum Condi		
Static Back Pressure:	·	Built-up Back F		IOLD PSIG
Vessel MAWP: 75.3 PSIG Allowable Overpressure: 10%				
Service: X Static			•	ture Disc: Yes
Pulsating	⊠No			
Fluid: Water Liquid	☐ Gas ⊠	MW: 18.0 1.329	152	$C_p/C_v$ :
Capacity Required: 20,000 lb/hr Density: 62.09 lb/ft <sup>3</sup> Viscosity: 0.744 cP				Viscosity: 0.744
Orifice: Calculated Area, in <sup>2</sup> : Selected Area, in <sup>2</sup> : Orifice Designation:				ignation:
Design Basis: Block	ed Flow			
	NTS / ACCESSORIES			
Cap: Screwed	Bolted	Lever: Pla	ain 🗌 Pack	red
7.4 Test Gag	☐ Field Test Connection	n 🔲 Pilot Fil	ter	
☐ Jacket ☐ Bolt-or	Field Test Connection  Integral Jacket Fluid:		sign P:	PSIG Design T:
MATERIALS	OF CONSTRUCTION			
<b>Body:</b> 316 SS		Bonnet: 316	SS	
Nozzle: 316 SS		<b>Disc</b> : 316 SS		
Guide: 316 SS				
Resilient Seats:		<b>Spring:</b> 316.9	SS	
Gaskets:		Flanges: 316	SS	
DOCUMENT	ATION			

With Bids

Certified

Approval

Operation & Performance Data	2	2
Literature & Parts List	2	2
Operating & Maintenance Instructions		2
Installation Instructions		2
Test & Inspection Reports		2
Material Certifications (CMTRs)		2
Code Certificate of Compliance		2
NOTES:		

Tag No.: RV-1502 Proton Beam Window Box Feed		Α.	Quantity Required: ONE	
Applicable Co	ode: ASME Section VIII Division	1		
	☐ Safety	☐ Relief	⊠ Sat	fety Relief
Туре	Sureey		<u> </u>	
	☐ Conventional	<b>⊠</b> Balanced Be	llows P	ilot Operated
	⊠ Flanged	Screwed		
Connections	Flange Rating: 1 Ra	50 F	ange Facing:	Raised Face 125-250
	Line Size: Inlet/Outlet	1	inches	
DESIGN CON	IDITIONS			
Set Pressure: HOI		Max Operating	Pressure	HOLD PSIG
	Operating 92 Flowing 92	Vacuum Condi		
Static Back Pressure	· · · · · · · · · · · · · · · · · · ·	Built-up Back F		IOLD PSIG
Vessel MAWP: HOLD PSIG Allowable Overpressure: 10%			)%	
Service: Static	<b>'</b>			oture Disc:  Yes
Fluid: Water Liquid	☐ Gas ⊠	MW: 18.0 1.329	152	$C_p/C_v$ :
Capacity Required: 4,830 lb/hr Density: 62.09 lb/ft <sup>3</sup> Viscosity: 0.744 cP				Viscosity: 0.744
Orifice: Calculated A	rea, in <sup>2</sup> : Selected Are	ea, in²:	Orifice Des	ignation:
Design Basis: Block	ed Flow			
A TOTAL CANA CEN	VEG. / A GGEGGODVEG			
	NTS / ACCESSORIES	Lavari Dia	in Dool	
Cap: Screwed	Bolted	Lever: Pla	ain 🗌 Pack	Rea
7.5 Test Gag	☐ Field Test Connection	n 🔲 Pilot Fil	ter	
☐ Jacket ☐ Bolt-or °F	n Integral Jacket Fluid:		sign P:	PSIG Design T:
MATERIALS	OF CONSTRUCTION			
<b>Body:</b> 316 SS		Bonnet: 316	SS	
Nozzle: 316 SS		<b>Disc:</b> 316 SS		
Guide: 316 SS				
Resilient Seats:		<b>Spring:</b> 316.9	SS	
Gaskets: Flanges: 316 SS				
DOCUMENT	ATION			

With Bids

Certified

Approval

_	2
2	2
	2
	2
	2
	2
	2
	2

Tag No.: RV-2000 Moderators Top Cryogenic Feed		Α.	Quantity Required: ONE	
Applicable Co	ode: ASME Section VIII Division	1		
	☐ Safety	☐ Relief	⊠ Sa	fety Relief
Туре			Surety Rener	
	☐ Conventional	<b>⊠</b> Balanced Be	llows P	ilot Operated
	<b>⊠</b> Flanged	Screwed		
Connections	Flange Rating: 1 Ra	50 FI	ange Facing:	Raised Face 125-250
	Line Size: Inlet/Outlet	1	inches	
DESIGN CON	IDITIONS			
Set Pressure: HOI		Max Operating	Pressure	HOLD PSIG
	Operating 80 Flowing 80	Vacuum Condi		
Static Back Pressure	·	Built-up Back F		IOLD PSIG
Vessel MAWP: 57.8 PSIG Allowable Overpressure: 10%			)%	
Service: Static	•			oture Disc:  Yes
Fluid: Water Liquid	☐ Gas ⊠	MW: 18.0 1.329	152	C <sub>p</sub> /C <sub>v</sub> :
Capacity Required: 7,925 lb/hr Density: 62.22 lb/ft <sup>3</sup> Viscosity: 0.858 cP				Viscosity: 0.858
Orifice: Calculated A	rea, in <sup>2</sup> : Selected Are	ea, in²:	Orifice Des	signation:
Design Basis: Block	ed Flow			
A TT A CLIMEN	UTC / A CCECCODIEC			
Cap: Screwed	NTS / ACCESSORIES  Bolted	Lever: Pla	ain 🗌 Pack	ved.
Cap. 🖂 Ociewed	Doited	Level.		\eu
7.6 Test Gag	☐ Field Test Connection	n 🗌 Pilot Fil	ter	
☐ Jacket ☐ Bolt-or	n	De	sign P:	PSIG Design T:
MATERIALS	OF CONSTRUCTION			
<b>Body</b> : 316 SS		Bonnet: 316	SS	
Nozzle: 316 SS		<b>Disc</b> : 316 SS		
Guide: 316 SS Bellows: 316 SS				
Resilient Seats:		<b>Spring:</b> 316 \$	SS	
Gaskets:		Flanges: 316	SS	
DOCUMENT	ATION			

With Bids

Certified

Approval

Operation & Performance Data	2	2
Literature & Parts List	2	2
Operating & Maintenance Instructions		2
Installation Instructions		2
Test & Inspection Reports		2
Material Certifications (CMTRs)		2
Code Certificate of Compliance		2
NOTES:		

Tag No.: RV-2001 Moderators Ambient Feed		Α.	Quantity Required: ONE	
Applicable Co	ode: ASME Section VIII Division	1		
	☐ Safety	Relief	⊠ Saf	ety Relief
Type	<u> </u>			
	☐ Conventional	<b>⊠</b> Balanced Be	llows Pi	lot Operated
	⊠ Flanged	Screwed		
Connections	Flange Rating: 1 Ra	50 F	ange Facing:	Raised Face 125-250
	Line Size: Inlet/Outlet	1	inches	
DESIGN CON	IDITIONS			
Set Pressure: HOI		Max Operating	Pressure	HOLD PSIG
	Operating 82 Flowing 82	Vacuum Condi		
Static Back Pressure	· · · · · · · · · · · · · · · · · · ·	Built-up Back F	Pressure: H	OLD PSIG
Vessel MAWP: 57.8 PSIG Allowable Overpressure: 10%			%	
Service: Station	·			ture Disc:  Yes
Fluid: Water Liquid	☐ Gas ⊠	MW: 18.0 1.329	152	C <sub>p</sub> /C <sub>v</sub> :
Capacity Required: 7,925 lb/hr Density: 62.20 lb/ft <sup>3</sup> Viscosity: 0.837 cP				Viscosity: 0.837
Orifice: Calculated A	rea, in <sup>2</sup> : Selected Are	ea, in²:	Orifice Desi	gnation:
Design Basis: Block	ed Flow			
A TT A CLIMEN	JTC / A CCECCODIEC			
Cap: Screwed	NTS / ACCESSORIES  Bolted	Lever: Pla	ain 🗌 Pack	 ed
oup. 🖂 colewed	Donce	20001.		Cu
7.7 Test Gag	☐ Field Test Connection			
☐ Jacket ☐ Bolt-or °F	n 🗌 Integral Jacket Fluid:	De	sign P:	PSIG Design T:
MATERIALS	OF CONSTRUCTION			
<b>Body:</b> 316 SS		Bonnet: 316	SS	
Nozzle: 316 SS		<b>Disc</b> : 316 SS		
<b>Guide:</b> 316 SS <b>Bellows:</b> 316 SS				
Resilient Seats:		<b>Spring:</b> 316.9	SS	
Gaskets:		Flanges: 316	SS	
DOCUMENT	ATION			

With Bids

Certified

Approval

Operation & Performance Data	2	2
Literature & Parts List	2	2
Operating & Maintenance Instructions		2
Installation Instructions		2
Test & Inspection Reports		2
Material Certifications (CMTRs)		2
Code Certificate of Compliance		2
NOTES:	·	

Tag No.: RV-2500A Reflector Plugs Vessel Wall Feed		A.	Quantity Required: ONE	
Applicable Co	ode: ASME Section VIII Division	1		
	☐ Safety	Relief	$\boxtimes \mathbf{s}$	afety Relief
Type				<u> </u>
	☐ Conventional	<b>⊠</b> Balanced Be	llows	Pilot Operated
	<b>⊠</b> Flanged	Screwed		
Connections	Flange Rating: 1 Ra	50 F	ange Facing:	Raised Face 125-250
	Line Size: Inlet/Outlet	1	inches	
DESIGN CON	IDITIONS			
Set Pressure: HOI		Max Operating	Pressure	HOLD PSIG
	Operating 92 Flowing 92	Vacuum Condi		
Static Back Pressure	· · · · · · · · · · · · · · · · · · ·	Built-up Back F		HOLD PSIG
Vessel MAWP: 55.3 PSIG Allowable Overpressure: 10%				
Service: Static	·			
	Hoavy Water Gas M			C <sub>p</sub> /C <sub>v</sub> : 1.32
Capacity Required:	puired: 7,405 lb/hr Density: 68.89 lb/ft <sup>3</sup> Viscosity: 0.896 cP			Viscosity: 0.896
Orifice: Calculated A	rea, in <sup>2</sup> : Selected Are		Orifice De	esignation:
Design Basis: Block				
-				
	NTS / ACCESSORIES			
Cap: Screwed	Bolted	Lever: Pla	ain ∐ Pad	cked
7.8 Test Gag Field Test Connection Pilot Filter  Jacket Bolt-on Integral Jacket Fluid: Design P: PSIG Design T:  PSIG Design T:				
·	OF CONSTRUCTION			
<b>Body:</b> 316 SS	or construction	Bonnet: 316	SS	
Nozzle: 316 SS		<b>Disc</b> : 316 SS		
<b>Guide:</b> 316 SS				
Resilient Seats: Spring: 316 SS				
Gaskets: Flanges: 316 SS				
DOCUMENT	ATION	<u>.                                      </u>		

With Bids

Certified

Approval

Operation & Performance Data	2	2
Literature & Parts List	2	2
Operating & Maintenance Instructions		2
Installation Instructions		2
Test & Inspection Reports		2
Material Certifications (CMTRs)		2
Code Certificate of Compliance		2
NOTES:		

Tag No.: RV-2500B Reflector Plugs Lower Outer Plug Feed		А.	Quantity Required: ONE	
Applicable Co	ode: ASME Section VIII Division	1		
☐ Safety		☐ Relief	⊠ Saf	ety Relief
Туре			-	
	Conventional	<b>⊠</b> Balanced Be	llows L Pi	llot Operated
	⊠ Flanged	Screwed		
Connections	Flange Rating: 1 Ra	50 FI	ange Facing:	Raised Face 125-250
	Line Size: Inlet/Outlet	1	inches	
DESIGN CON	IDITIONS			
Set Pressure: HOI		Max Operating	Pressure	HOLD PSIG
	perating 92 Flowing 92	Vacuum Condi		
Static Back Pressure	HOLD PSIG	Built-up Back F	Pressure: <b>H</b>	OLD PSIG
Vessel MAWP:	<u>'</u>			%
Service: Static Pulsating	Service: Static Cyclic Installed Downstream of Rupture Disc: Yes			ture Disc: ☐Yes
Fluid: Heavy Wa Liquid	ater	MW: 20.0	3152	$C_p/C_v$ : 1.32
Capacity Required:	Required: HOLD lb/hr Density: 68.89 lb/ft <sup>3</sup> Viscosity: 0.896 cP			
Orifice: Calculated A	rea, in <sup>2</sup> : Selected Are	ea, in²:	Orifice Desi	ignation:
Design Basis: Block	ed Flow			
	JEG / A COEGGODIEG			
Cap: Screwed	NTS / ACCESSORIES  Bolted	Lever: Pla	nin 🗌 Pack	
Cap. 🖂 Ociewed	Boiled	Level.		.eu
7.9 Test Gag Field Test Connection Pilot Filter				
☐ Jacket ☐ Bolt-or	n 🗌 Integral Jacket Fluid:	De	sign P:	PSIG Design T:
MATERIALS	OF CONSTRUCTION			
<b>Body</b> : 316 SS		Bonnet: 316	SS	
Nozzle: 316 SS		<b>Disc:</b> 316 SS		
Guide: 316 SS	6 SS Bellows: 316 SS			
Resilient Seats:		<b>Spring:</b> 316 \$	SS	
Gaskets:	skets: Flanges: 316 SS			
DOCUMENT.	ATION			

With Bids

Certified

Approval

Operation & Performance Data	2	2
Literature & Parts List	2	2
Operating & Maintenance Instructions		2
Installation Instructions		2
Test & Inspection Reports		2
Material Certifications (CMTRs)		2
Code Certificate of Compliance		2
NOTES:		

		T	
Tag No.: RV-2500C Reflector Plugs Lower Outer Plug Feed  A. Quantity Required: ONE			
Applicable Co	ode: ASME Section VIII Division	1	
	☐ Safety ☐ Relief ☐ Safety Relief		
Туре			
	☐ Conventional	<b>⊠</b> Balanced Bellows ☐ Pilot Oper	ated
	<b>⊠</b> Flanged	Screwed	
Connections	Flange Rating: 1 Ra	Flange Facing: Raised F	Face 125-250
	Line Size: Inlet/Outlet	/ inches	
DESIGN CON	IDITIONS		
Set Pressure: HOI		Max Operating Pressure HOLD	PSIG
Temperature, °F: C	Operating 92 Flowing 92	Vacuum Conditions Inlet/Outlet:	/
Static Back Pressure	, , , ,		
Vessel MAWP:	55.3 PSIG Allowable Overpressure: 10%		
Service: Static	· · · · · · · · · · · · · · · · · · ·		
Fluid: Heavy Wa	ater 🔲 Gas 🖂	MW: 20.03152 C <sub>p</sub> /C	C <sub>v</sub> : 1.32
	: HOLD lb/hr Density: 68.89 lb/ft <sup>3</sup> Viscosity: 0.896 cP		
Orifice: Calculated A	rea, in <sup>2</sup> : Selected Are		
Design Basis: Block			
-			
	NTS / ACCESSORIES		
Cap: Screwed	Bolted	Lever: Plain Packed	
7.10 Test Gag Field Test Connection Pilot Filter  Jacket Bolt-on Integral Jacket Fluid: Design P: PSIG Design T:			
°F	mogra. cachet i ala.	2 00.g. 1 1 0.0	200igii 11
MATERIALS	OF CONSTRUCTION		
<b>Body:</b> 316 SS		Bonnet: 316 SS	
Nozzle: 316 SS		<b>Disc</b> : 316 SS	
Guide: 316 SS	Bellows: 316 SS		
Resilient Seats:			
Gaskets:	Flanges: 316 SS		
DOCUMENT	ATION		
POCOMENT	TITON		

With Bids

Certified

Approval

Operation & Performance Data	2	2
Literature & Parts List	2	2
Operating & Maintenance Instructions		2
Installation Instructions		2
Test & Inspection Reports		2
Material Certifications (CMTRs)		2
Code Certificate of Compliance		2
NOTES:		

Tag No.: RV-2500D Reflector Plugs Intermediate Outer Plug Feed		A.	Quantity Required: ONE	
Applicable Co	ode: ASME Section VIII Division	1		
☐ Safety		Relief	⊠ s:	afety Relief
Туре	Sureey			aroty recirci
	☐ Conventional	<b>⊠</b> Balanced Be	llows	Pilot Operated
	⊠ Flanged	Screwed		
Connections	Flange Rating: 1 Ra	50 F	ange Facing:	Raised Face 125-250
	Line Size: Inlet/Outlet	1	inches	
DESIGN CON	IDITIONS			
Set Pressure: HOI		Max Operating	Pressure	HOLD PSIG
	Operating 92 Flowing 92	Vacuum Condi		
Static Back Pressure:	· · · · · · · · · · · · · · · · · · ·	Built-up Back F	Pressure:	HOLD PSIG
Vessel MAWP: 5	55.3 PSIG Allowable Overpressure: 10%			
Service: Static	•			
Fluid: Heavy Wa	ater 🗌 Gas 🛚	MW: 20.0	3152	C <sub>p</sub> /C <sub>v</sub> : 1.32
Capacity Required:	: HOLD lb/hr Density: 68.89 lb/ft <sup>3</sup> Viscosity: 0.896 cP			
Orifice: Calculated A	rea, in <sup>2</sup> : Selected Are		Orifice De	signation:
Design Basis: Block				
-				
	NTS / ACCESSORIES			
Cap: Screwed	Bolted	Lever: Pla	ain ∐ Pac	cked
7.11 Test Gag Field Test Connection Pilot Filter				
☐ Jacket ☐ Bolt-or °F	n 🗌 Integral Jacket Fluid:	De	sign P:	PSIG Design T:
MATERIALS	OF CONSTRUCTION			
<b>Body:</b> 316 SS		Bonnet: 316	SS	
Nozzle: 316 SS		<b>Disc:</b> 316 SS		
Guide: 316 SS	Bellows: 316 SS			
Resilient Seats:				
Gaskets:	Flanges: 316 SS			
DOCUMENTA	ATION			

With Bids

Certified

Approval

Operation & Performance Data	2	2
Literature & Parts List	2	2
Operating & Maintenance Instructions		2
Installation Instructions		2
Test & Inspection Reports		2
Material Certifications (CMTRs)		2
Code Certificate of Compliance		2
NOTES:		

Tag No.: RV-2500E Reflector Plugs Lower (Bottom) Outer Plug Feed		ottom) Outer	Α.	Quantity Required: ONE
Applicable Co	ode: ASME Section VIII Division	1		
	☐ Safety	☐ Relief	⊠ S:	afety Relief
Туре	Bureey	Rener	⊠ Sarcty Kener	
	☐ Conventional	<b>⊠</b> Balanced Be	llows 1	Pilot Operated
	⊠ Flanged	Screwed		
Connections	Flange Rating: 1 Ra	50 F	ange Facing:	Raised Face 125-250
	Line Size: Inlet/Outlet	1	inches	
DESIGN CON	IDITIONS			
Set Pressure: HOI		Max Operating	Pressure	HOLD PSIG
	Operating 92 Flowing 92	Vacuum Condi		
Static Back Pressure:	· · · · · · · · · · · · · · · · · · ·	Built-up Back F		HOLD PSIG
Vessel MAWP: 55.3 PSIG Allowable Overpre				0%
Service: Static Cyclic Installed Downstream of Rupture Disc: Yes			pture Disc:  Yes	
Fluid: Heavy Wa	ater 🗌 Gas 🛚	MW: 20.0	3152	C <sub>p</sub> /C <sub>v</sub> : 1.32
Capacity Required: HOLD lb/hr Density: 68.89 lb/ft <sup>3</sup> Viscosity: 0.896 cP				
Orifice: Calculated A	rea, in <sup>2</sup> : Selected Are		Orifice De	signation:
Design Basis: Block		-		
-				
	NTS / ACCESSORIES			
Cap: Screwed	Bolted	Lever: Pla	ain ∐ Pac	cked
7.12 Test Gag	☐ Field Test Connection			
☐ Jacket ☐ Bolt-or °F	n 🗌 Integral Jacket Fluid:	De	sign P:	PSIG Design T:
MATERIALS	OF CONSTRUCTION			
<b>Body:</b> 316 SS <b>Bonnet:</b> 316 SS				
Nozzle: 316 SS	<b>Disc</b> : 316 SS			
Guide: 316 SS	Bellows: 316 SS			
Resilient Seats:		<b>Spring:</b> 316.9	SS	
Gaskets:	· •			
DOCUMENTA	ATION			

With Bids

Certified

Approval

Operation & Performance Data	2	2
Literature & Parts List	2	2
Operating & Maintenance Instructions		2
Installation Instructions		2
Test & Inspection Reports		2
Material Certifications (CMTRs)		2
Code Certificate of Compliance		2
NOTES:	·	•

Tag No.: RV-2500F Reflector Plugs Intermediate Inner Plug Feed A. Quantity Required: ONE				
Applicable Co	ode: ASME Section VIII Division	1		
	☐ Safety	Relief	⊠ Sa	fety Relief
Type				
	☐ Conventional	<b>⊠</b> Balanced Bell	lows P	ilot Operated
	<b>⊠</b> Flanged	Screwed		
Connections	Flange Rating: 1 Ra	50 Fla	ange Facing:	Raised Face 125-250
	Line Size: Inlet/Outlet	1	inches	
DESIGN CON	IDITIONS			
Set Pressure: HOI		Max Operating	Pressure	HOLD PSIG
Temperature, °F: C	Operating 92 Flowing 92	Vacuum Condit		tlet: /
Static Back Pressure	<u> </u>	Built-up Back P	ressure: <b>F</b>	HOLD PSIG
Vessel MAWP: 55.3 PSIG Allowable Overpressure: 10%			)%	
Service: Static Cyclic Installed Downstream of Rupture Disc: Yes Pulsating			oture Disc:  Yes	
Fluid: Heavy Wa	ater 🔲 Gas 🖂	MW: 20.03	3152	C <sub>p</sub> /C <sub>v</sub> : 1.32
Capacity Required: 4,263 lb/hr Density: 68.89 lb/ft <sup>3</sup> Viscosity: 0.896 cP				
Orifice: Calculated A	rea, in <sup>2</sup> : Selected Are		Orifice Des	signation:
Design Basis: Block				-
-				
	NTS / ACCESSORIES			
Cap: Screwed	Bolted	Lever:  Pla	in	ked
7.13 Test Gag	Field Test Connection  Integral Jacket Fluid:		er ign P:	PSIG Design T:
°F	i 🔲 ililegiai Jacket Fluid.	Des	igii F.	FSIG Design 1.
MATERIALS	OF CONSTRUCTION			
<b>Body:</b> 316 SS		Bonnet: 316	SS	
Nozzle: 316 SS		<b>Disc:</b> 316 SS		
Guide: 316 SS				
Resilient Seats:				
Gaskets:				
DOCUMENT	ATION			
POCOMENT	TITON			

With Bids

Certified

Approval

Operation & Performance Data	2	2
Literature & Parts List	2	2
Operating & Maintenance Instructions		2
Installation Instructions		2
Test & Inspection Reports		2
Material Certifications (CMTRs)		2
Code Certificate of Compliance		2
NOTES:		

Tag No.: RV-2500G Reflector Plugs Lower Upper Inner Plug Feed			A.	Quantity Required: ONE
Applicable Co	ode: ASME Section VIII Division	1		
	☐ Safety	☐ Relief	⊠s	afety Relief
Type				
	☐ Conventional	<b>⊠</b> Balanced Be	llows	Pilot Operated
	⊠ Flanged	Screwed		
Connections	Flange Rating: 1 Ra	50 F	ange Facing:	Raised Face 125-250
	Line Size: Inlet/Outlet	1	inches	
DESIGN CON	IDITIONS			
Set Pressure: HOI		Max Operating	Pressure	HOLD PSIG
	Operating 92 Flowing 92	Vacuum Condi		
Static Back Pressure	·	Built-up Back F	Pressure:	HOLD PSIG
Vessel MAWP: 55.3 PSIG Allowable Overpressu			rpressure: 1	0%
Service: Static Cyclic Installed Downstream of Rupture Disc: Ye Pulsating			ıpture Disc:	
Fluid: Heavy Wa	ater 🔲 Gas 🖂	MW: 20.0	3152	C <sub>p</sub> /C <sub>v</sub> : 1.32
Capacity Required: 33,154 lb/hr Density: 68.89 lb/ft <sup>3</sup> Viscosity: 0.896 cP				
Orifice: Calculated Area, in <sup>2</sup> : Selected Area, in <sup>2</sup> : Orifice Designation:				
Design Basis: Block	ed Flow			
	NTS / ACCESSORIES	Lavari Dia	in Doe	Nr. d
Cap: Screwed	Bolted	Lever: Pla	ain ∟ Pac	cked
7.14 Test Gag	☐ Field Test Connection	n 🔲 Pilot Fil	ter	
☐ Jacket ☐ Bolt-or °F	n Integral Jacket Fluid:		sign P:	PSIG Design T:
MATERIALS	OF CONSTRUCTION			
<b>Body:</b> 316 SS <b>Bonnet:</b> 316 SS				
Nozzle: 316 SS	<b>Disc</b> : 316 SS			
Guide: 316 SS	Bellows: 316 SS			
Resilient Seats:		<b>Spring:</b> 316 \$	SS	
Gaskets:		Flanges: 316	SS	
DOCUMENT	ATION			

With Bids

Certified

Approval

Operation & Performance Data	2	2
Literature & Parts List	2	2
Operating & Maintenance Instructions		2
Installation Instructions		2
Test & Inspection Reports		2
Material Certifications (CMTRs)		2
Code Certificate of Compliance		2
NOTES:	·	•

Tag No.: RV Plug Feed	-2500H Reflector Plugs Lower Lo	ower Inner		Quantity Required: ONE	
Applicable Co	ode: ASME Section VIII Division	1			
☐ Safety		Relief	<b>⊠</b> Safety 1	Relief	
Type	☐ Conventional			Operated	
			iows i not c	эрстанси	
	⊠ Flanged	Screwed			
Connections	Flange Rating: 1 Ra	.50 Fl	ange Facing: Rais	sed Face 125-250	
	Line Size: Inlet/Outlet	1	inches		
DESIGN CON	IDITIONS				
Set Pressure: HOI		Max Operating	Pressure HOL	D PSIG	
Temperature, °F: C	perating 92 Flowing 92	Vacuum Condi	tions Inlet/Outlet:	/	
Static Back Pressure:	HOLD PSIG	Built-up Back Pressure: HOLD PSIG			
Vessel MAWP: 5	55.3 PSIG	Allowable Overpressure: 10%			
Service: Static Cyclic Dulsating		Installed Downstream of Rupture Disc: ☐Yes ☐No			
Fluid: Heavy Wa Liquid	ater ☐ Gas ⊠	MW: 20.03	3152	$C_p/C_v$ : 1.32	
Capacity Required:	Capacity Required: 33,154 lb/nr cP			osity: 0.896	
Orifice: Calculated Area, in <sup>2</sup> : Selected Area, in <sup>2</sup> : Orifice Designation:					
Design Basis: Blocked Flow					
ATTACHMEN	NTS / ACCESSORIES				
Cap: Screwed	Bolted	Lever: 🗌 Pla	in 🗌 Packed		
7 15 Took Coo	Field Took Commontion	. District	<b>.</b>		
7.15 LTest Gag	☐ Field Test Connection ☐ Integral Jacket Fluid:			SIG Design T:	
°F					
MATERIALS	OF CONSTRUCTION				
<b>Body:</b> 316 SS <b>Bonnet:</b> 316 SS					
Nozzle: 316 SS		<b>Disc</b> : 316 SS			
Guide: 316 SS		Bellows: 316 SS			
Resilient Seats:	lient Seats: Spring: 316 SS				
Gaskets:		Flanges: 316	SS		
DOCUMENTA	ATION				
2 GCCIMENT		With Bids	Approval	Certified	

Operation & Performance Data	2	2
Literature & Parts List	2	2
Operating & Maintenance Instructions		2
Installation Instructions		2
Test & Inspection Reports		2
Material Certifications (CMTRs)		2
Code Certificate of Compliance		2
NOTES:		

Tag No.: RV Plug Feed	-2500J Reflector Plugs Lower Mi	iddle Inner		Quantity Required: ONE	
Applicable Co	ode: ASME Section VIII Division	1			
☐ Safety		Relief	<b>⊠</b> Safety 1	Relief	
Type					
	_ Conventional	<b>⊠</b> Balanced Bel	llows	Operated	
	<b>⊠</b> Flanged	Screwed			
Connections	Flange Rating: 1 Ra	.50 Fl	ange Facing: Rais	sed Face 125-250	
	Line Size: Inlet/Outlet	/	inches		
DESIGN CON	IDITIONS				
Set Pressure: HOI		Max Operating	Pressure HOL	D PSIG	
Temperature, °F: C	perating 92 Flowing 92	Vacuum Condi	tions Inlet/Outlet:	/	
Static Back Pressure:	HOLD PSIG	Built-up Back Pressure: HOLD PSIG			
Vessel MAWP: 5	55.3 PSIG	Allowable Overpressure: 10%			
Service: ☐ Static ☐ Cyclic ☐ Pulsating		Installed Downstream of Rupture Disc: ☐Yes ☐No			
Fluid: Heavy Wa Liquid	ater 🗌 Gas 🛚	MW: 20.03	3152	$C_p/C_v$ : 1.32	
Capacity Required:	16,577 lb/hr	Density: 68.8 cP	9 lb/ft <sup>3</sup> Visc	cosity: 0.896	
Orifice: Calculated Area, in <sup>2</sup> : Selected Area, in <sup>2</sup> : Orifice Designation:					
Design Basis: Blocked Flow					
ATTACHMEN	NTS / ACCESSORIES				
Cap: Screwed	☐ Bolted	Lever:	in		
7.16 Test Gag	☐ Field Test Connection	n 🗌 Pilot Fil	ter		
☐ Jacket ☐ Bolt-or	n 🔲 Integral Jacket Fluid:			SIG Design T:	
MATERIALS	OF CONSTRUCTION				
<b>Body:</b> 316 SS	<b>Body:</b> 316 SS <b>Bonnet:</b> 316 SS				
Nozzle: 316 SS		<b>Disc</b> : 316 SS			
Guide: 316 SS		Bellows: 316 SS			
Resilient Seats:	t Seats: Spring: 316 SS				
Gaskets:		Flanges: 316	SS		
DOCUMENTA	ATION				
	- * * *	With Bids	Approval	Certified	

Operation & Performance Data	2	2
Literature & Parts List	2	2
Operating & Maintenance Instructions		2
Installation Instructions		2
Test & Inspection Reports		2
Material Certifications (CMTRs)		2
Code Certificate of Compliance		2
NOTES:		

Tag No.: RV-9301 Ring Injection Beam Stop Window Feed			Α.	Quantity Required: ONE
Applicable Co	ode: ASME Section VIII Division	1		
	Relief	⊠ Sat	fety Relief	
Туре	☐ Safety	Kener		icty Kener
	☐ Conventional	<b>⊠</b> Balanced Be	llows P	ilot Operated
	⊠ Flanged	Screwed		
Connections	Flange Rating: 1 Ra	.50 F	ange Facing:	Raised Face 125-250
	Line Size: Inlet/Outlet	1	inches	
DESIGN CON	IDITIONS			
Set Pressure: HOI		Max Operating	Pressure	HOLD PSIG
	Operating 92 Flowing 92	Vacuum Condi		
Static Back Pressure	·	Built-up Back F		IOLD PSIG
Vessel MAWP: HOLD PSIG Allowable Overpressure: 10%			)%	
Service: Static Cyclic Installed Downstream of Rupture Disc: Yes Pulsating				oture Disc:  Yes
Fluid: Water Liquid	☐ Gas ⊠	MW: 18.0 1.329	152	C <sub>p</sub> /C <sub>v</sub> :
Capacity Required: 750 lb/hr Density: 62.09 lb/ft <sup>3</sup> Viscosity: 0.744 cP				
Orifice: Calculated A	rea, in <sup>2</sup> : Selected Are	ea, in²:	Orifice Des	ignation:
Design Basis: Block	ed Flow			
A TETT A CIVIN (TEX	TEG / A COEGGODIEG			
	NTS / ACCESSORIES  Bolted	Lever: Pla	ain 🗌 Pack	vod.
Cap: Screwed	Boiled	Lever: L Pla	III	Red
7.17 Test Gag	☐ Field Test Connection	n 🔲 Pilot Fil	ter	
☐ Jacket ☐ Bolt-or °F	n 🗌 Integral Jacket Fluid:	De	sign P:	PSIG Design T:
MATERIALS	OF CONSTRUCTION			
<b>Body:</b> 316 SS <b>Bonnet:</b> 316 SS				
Nozzle: 316 SS		<b>Disc:</b> 316 SS		
Guide: 316 SS	S Bellows: 316 SS			
Resilient Seats:		<b>Spring:</b> 316.9	SS	
Gaskets:				
DOCUMENT	ATION			

With Bids

Certified

Approval

Operation & Performance Data	2	2
Literature & Parts List	2	2
Operating & Maintenance Instructions		2
Installation Instructions		2
Test & Inspection Reports		2
Material Certifications (CMTRs)		2
Code Certificate of Compliance		2
NOTES:		

Tag No.: RV-9302 Ring Injection Beam Stop Feed  A. Quantity Required: ONE					
Applicable Code: ASME Section VIII Division 1					
	☐ Safety	Relief	⊠ Sa	fety Relief	
Туре					
	Conventional	<b>⊠</b> Balanced Bel	lows LP	ilot Operated	
	<b>⊠</b> Flanged	☐ Screwed			
Connections	Flange Rating: 1 Ra	.50 Fl	ange Facing:	Raised Face 125-250	
	Line Size: Inlet/Outlet	/	inches		
DESIGN CON	IDITIONS				
Set Pressure: HOI		Max Operating	Pressure	HOLD PSIG	
Temperature, °F: C		Vacuum Condi			
Static Back Pressure		Built-up Back F	Pressure: H	IOLD PSIG	
Vessel MAWP:	150 PSIG	Allowable Over		)%	
Service: Static Pulsating	Cyclic	⊠No	·	oture Disc: ☐Yes	
Fluid: Water Liquid	☐ Gas ⊠	MW: 18.0 1.329	152	$C_p/C_v$ :	
Capacity Required:	22,500 lb/hr	Density: 62.0 cP	9 lb/ft <sup>3</sup>	Viscosity: 0.744	
Orifice: Calculated A	rea, in <sup>2</sup> : Selected Are	ea, in²:	Orifice Des	ignation:	
Design Basis: Block	ed Flow				
ATTACHMEN	NTS / ACCESSORIES				
Cap: Screwed	Bolted	Lever: Pla	in	red	
<u></u>		n ∏ Pilot Fil	<u> </u>		
7.18 Test Gag  Jacket Bolt-or	☐ Field Test Connection ☐ Integral Jacket Fluid:		sign P:	PSIG Design T:	
MATERIALS	OF CONSTRUCTION				
<b>Body:</b> 316 SS		Bonnet: 316	SS		
Nozzle: 316 SS		<b>Disc</b> : 316 SS			
Guide: 316 SS		Bellows: 316	SS		
Resilient Seats:		<b>Spring</b> : 316 9	SS		
Gaskets:		Flanges: 316	SS		
DOCUMENT	ATION		_		

	With Bids	Approval	Certified
Outline Dimensional Drawings	2		2
Operation & Performance Data	2		2

Literature & Parts List	2	2
Operating & Maintenance Instructions		2
Installation Instructions		2
Test & Inspection Reports		2
Material Certifications (CMTRs)		2
Code Certificate of Compliance		2
NOTES:		

Tag No.: R	Tag No.: RD-1251 Mercury Exchanger Loop G/L Separator  A. Quantity Required: ONE					
Applicable	Code: ASME Code, Sec	ction VIII, Divisio	n 1			
	☐ Forward Acting	☐ Scored				
DISC	□ Reverse Acting	Scored	Knife Blade			
	Non-Fragmenting     ■	☐ Sanitary	☐ Polymerizing Sei	vice	ıposite	
	☐ None	<b>⊠</b> Insert	Bolted Th	readed	] Union	
HOLDER	☐ Sanitary	☐ Flow Sweeps	Disc			
	Line Size: 3	inches				
DESIGN CO	ONDITIONS					
Burst Pressure: 150 PSIG Manufacturing Range: +0/-5%						
Burst Temperature: 113 °F Vacuum Conditions Inlet/Outlet: FV / -				FV/-		
Static Back	Pressure: 0 P	SIG	Built-up Back Pres	sure: HOL	D PSIG	
Vessel MA	WP 150 F	PSIG	Normal Max Opera	ating Pressure	135 PSIG	
Service: Pulsating	⊠ Static ☐ Cycli	ic 🗌	Installed Upstream	n of PSV:	Yes 🛛 No	
Fluid: Water $\square$ Gas $\boxtimes$ MW: 18.0152 $C_p/C_v$ : 1.329			<sub>p</sub> /C <sub>v</sub> : 1.329			
Capacity Required: 200,742 lb/hr Density: 61.8 lb/ft <sup>3</sup> Viscosity: 0.596 cP						
	ENTS / ACCESSORIES isc Indicator:	ed circuit	en Contact	tical Cla	ss 1 Group B Div	
Jack Sci	rews Gauge	Tap (1/4" on inlet/	outlet)	ale Assembly		
_	embly Screws	_	]			
MATERIAI	LS OF CONSTRUCTION					
<b>Disc:</b> 316			Holder: 316L S	3		
Gaskets:			Flanges:			
Seal (for C	Composite):			_		
DOCUMEN	TATION					
With Rids Approval Certified						

	With Bids	Approval	Certified
Outline Dimensional Drawings	2		2
Operation & Performance Data	2		2
Literature & Parts List	2		2

Operating & Maintenance Instructions	2
Installation Instructions	2
Test & Inspection Reports	2
Material Certifications (CMTRs)	2
Code Certificate of Compliance	2
NOTES:	

Tag No.: R	Tag No.: RD-1252 Mercury Exchanger Loop Filter  B. Quantity Required: ONE				
Applicable	Code: ASME Code, Sec	ction VIII, Divisio	n 1		
	☐ Forward Acting	☐ Scored			
DISC	□ Reverse Acting	Scored	Knife Blade		
	Non-Fragmenting     ■	☐ Sanitary	☐ Polymerizing Ser	vice   Com	posite
	☐ None	<b>⊠</b> Insert	Bolted Th	readed	Union
HOLDER	☐ Sanitary	☐ Flow Sweeps	Disc		
	Line Size: 3/4	inches			
DESIGN CO	ONDITIONS				
	DESIGN CONDITIONS  Burst Pressure: 150 PSIG Manufacturing Range: +0/-5%				
3 3			FV/-		
Static Back	Pressure: 0 P	SIG	Built-up Back Press	sure: <b>HOLI</b>	<b>D</b> PSIG
Vessel MA	WP 150 F	PSIG	Normal Max Opera	ting Pressure	135 PSIG
Service: Static Cyclic Installed Upstream of PSV:			of PSV:	Yes 🛛 No	
Fluid: Water 🗵 Gas 🗌 Liquid			MW: 18.0152	С	<sub>p</sub> /C <sub>v</sub> : 1.329
Capacity Required: 1,085 lb/hr Density: 0.363 lb/ft <sup>3</sup> Viscosity: 0.0156 cP			osity: 0.0156		
	ATTACHMENTS / ACCESSORIES  Burst Disc Indicator: Closed circuit Open Contact Optical Class 1 Group B Div				
☐ Jack Sci	rews Gauge	Tap (¼" on inlet/	outlet)	ale Assembly	
Pre-ass	embly Screws 🔲 E	Baffle Plate			
MATERIAI	LS OF CONSTRUCTION				
<b>Disc</b> : 316	LSS		Holder: 316L SS		
Gaskets:			Flanges:		
Seal (for C	composite):				
DOCUMEN	ITATION				
			With Rids	Annroval	Certified

2

2

2

2

2

**Outline Dimensional Drawings** 

Operation & Performance Data

Literature & Parts List

Operating & Maintenance Instructions	2
Installation Instructions	2
Test & Inspection Reports	2
Material Certifications (CMTRs)	2
Code Certificate of Compliance	2
NOTES:	

Tag No.: R	Tag No.: RD-1253 Mercury Exchanger Loop Drain Tank  C. Quantity Required: ONE					
Applicable	Code: ASME Code, Section VIII, Div	vision 1				
	☐ Forward Acting ☐ Scored					
DISC		☐ Knife Blade				
	Non-Fragmenting ☐ Sanitar	y	Service Com	posite		
	□ None	Bolted	Threaded	Union		
HOLDED						
HOLDER	HOLDER Sanitary Flow Sweeps Disc					
	Line Size: 1 inches					
DESIGN CO	ONDITIONS					
Burst Pres		Manufacturing	Range: +0/-5%			
Burst Tem	perature: 366 °F		Vacuum Conditions Inlet/Outlet: FV / -			
	R Pressure: 0 PSIG	Built-up Back F	Built-up Back Pressure: <b>HOLD</b> PSIG			
Vessel MA	WP 150 PSIG	Normal Max O	Normal Max Operating Pressure 135 PSIG			
Service: Pulsating	Static	Installed Upstr	Installed Upstream of PSV:  Yes  No			
Fluid: Water Signal MW: 18.0152 C <sub>p</sub> /C <sub>v</sub> : 1.329 Liquid				<sub>p</sub> /C <sub>v</sub> : 1.329		
Capacity R	equired: 2,113 lb/hr	Density: 0.3 cP	63 lb/ft <sup>3</sup> Visc	osity: 0.0156		
ATTACIDA	IENTS / A CCESCODIES					
□ Burst D	IENTS / ACCESSORIES isc Indicator: ☐ Closed circuit ☐	Open Contact	Optical Class	ss 1 Group B Div		
2						
Jack Sc		nlet/outlet) T	ell-tale Assembly			
☐ Pre-ass	embly Screws Baffle Plate					
MATERIAI	LS OF CONSTRUCTION					
<b>Disc:</b> 316	SL SS	Holder: 316	_ SS			
Gaskets:		Flanges:				
Seal (for C	Composite):					
DOCUMEN	IT A TION					
DOCUMEN	NIATION	With Bids	Approval	Certified		
Outline Din	nensional Drawings	2	11 -	2		

2

Literature & Parts List	2	2
Operating & Maintenance Instructions		2
Installation Instructions		2
Test & Inspection Reports		2
Material Certifications (CMTRs)		2
Code Certificate of Compliance		2
NOTES:		

Tag No.: R	Tag No.: RD-1751 Target Shroud/Proton Beam Window Loop Filter  D. Quantity Required: ONE					
Applicable	Code: ASME Code, Section VIII, Div	rision 1				
	☐ Forward Acting ☐ Scored					
DISC	□ Reverse Acting □ Scored	☐ Knife Blade				
2250			S			
	Non-Fragmenting ☐ Sanitary	Polymerizing	Service	posite		
	☐ None ☐ Insert	☐ Bolted ☐	Threaded	Union		
HOLDER	Sanitary Flow Sw	eeps Disc				
Line Size: 1 inches						
	Eme Size. 1 menes					
	ONDITIONS	NA - Contract	D			
Burst Pres			Manufacturing Range: +0/-5%			
Burst Tem			Vacuum Conditions Inlet/Outlet: FV / - Built-up Back Pressure: HOLD PSIG			
	Pressure: 0 PSIG					
Vessel MAWP       150       PSIG       Normal Max Operating Pressure       135       PSIG         Service:       ☑ Static       ☐ Cyclic       ☐       Installed Unstream of DSV/L       ☐ Ves       ☑ No						
Pulsating	-	Installed Upstre	eam of PSV:	Yes 🛛 No		
Fluid: Liquid	Water ⊠ Gas □	MW: 18.01		<sub>p</sub> /C <sub>v</sub> : 1.329		
Capacity R	equired: 1,530 lb/hr	Density: 0.36 cP	63 lb/ft <sup>3</sup> Visc	osity: 0.0156		
лттл <i>с</i> им	ENTS / ACCESSORIES					
	isc Indicator:   Closed circuit	Open Contact	Optical Clas	ss 1 Group B Div		
Jack Sc			ell-tale Assembly			
☐ Pre-ass	embly Screws					
MATERIAI	LS OF CONSTRUCTION					
<b>Disc:</b> 316	SL SS	Holder: 316L	SS			
Gaskets:		Flanges:				
Seal (for C	composite):					
DOCUMEN	TATION					
		With Bids	Approval	Certified		
Outline Din	nensional Drawings	2		2		

2

2

Literature & Parts List	2	2
Operating & Maintenance Instructions		2
Installation Instructions		2
Test & Inspection Reports		2
Material Certifications (CMTRs)		2
Code Certificate of Compliance		2
NOTES:		

Tag No.: RD-1752 Target Shroud/Proton Beam Window Loop Drain Tank  E. Quantity Required: ONE					
Applicable	Applicable Code: ASME Code, Section VIII, Division 1				
	☐ Forward Acting ☐ Scored				
DISC	□ Reverse Acting □ Scored	☐ Knife Blade			
			Samias D Com	magita	
	Non-Fragmenting   □ Sanitary   □ Polymerizing Service   □ Composite			iposite	
	□ None   □ Insert   □ Bolted   □ Threaded   □ Union			Union	
HOLDER	☐ Sanitary ☐ Flow Sw	veeps Disc			
	Line Size: 3/4 inches				
Burst Pres	ONDITIONS sure: 150 PSIG	Manufacturing	Range: +0/-5%		
Burst Tem			Manufacturing Range: +0/-5%  Vacuum Conditions Inlet/Outlet: FV / -		
			Built-up Back Pressure: <b>HOLD</b> PSIG		
Static Back Pressure: 0 PSIG  Vessel MAWP 150 PSIG		· · · · · · · · · · · · · · · · · · ·	perating Pressure	135 PSIG	
Service: Static Cyclic					
Pulsating	Pulsating Installed Upstream of PSV: Yes X No			Yes 🛛 No	
Fluid: Water $\square$ Gas $\square$ MW: 18.0152 $C_p/C_v$ : 1.329 Liquid			<sub>p</sub> /C <sub>v</sub> : 1.329		
Capacity R				osity: 0.0156	
ATTACIIN	IENTS / ACCESSORIES	·			
	isc Indicator:	Open Contact	Optical Class	ss 1 Group B Div	
☐ Jack Sc	rows Cougo Ton (1/2) on i	nlot/outlot)	all tale Assambly		
	rews Gauge Tap (1/4" on in sembly Screws Baffle Plate		ell-tale Assembly		
	Bame : late				
MATERIALS OF CONSTRUCTION					
	Disc: 316L SS Holder: 316L SS				
Gaskets:		Flanges:			
Seal (for C	Composite):	_			
DOCUMEN	IT A TION				
DOCUMEN	NIAIION	With Bids	Approval	Certified	
Outline Dir	nensional Drawings	2	· + F - • · • · ·	2	

2

2

2

Operation & Performance Data

Literature & Parts List

Operating & Maintenance Instructions	2
Installation Instructions	2
Test & Inspection Reports	2
Material Certifications (CMTRs)	2
Code Certificate of Compliance	2
NOTES:	

Tag No.: R	Tag No.: RD-1753 Target Shroud/Proton Beam Window Loop G/L Sep.  F. Quantity Required: ONE				
Applicable	Applicable Code: ASME Code, Section VIII, Division 1				
	☐ Forward Acting ☐ Scored				
DISC	□ Reverse Acting □ Scored	☐ Knife Blade			
			Samiaa	magita	
	□ None   ☑ Insert   □ Bolted   □ Threaded   □ Union			Union	
HOLDER	☐ Sanitary ☐ Flow Swo	eeps Disc			
	Line Sines 2 inches				
	Line Size: 2 inches				
DESIGN C	ONDITIONS				
Burst Pressure: 53 PSIG Manufacturing Range: +0/-5%					
Burst Tem	perature: 101 °F	Vacuum Condi	Vacuum Conditions Inlet/Outlet: FV / -		
Static Back	Pressure: 0 PSIG	Built-up Back F	Built-up Back Pressure: <b>HOLD</b> PSIG		
Vessel MAWP 150 PSIG Normal Max Operating Pressure 47 PSIG			47 PSIG		
Service: Static Cyclic Installed Upstream of PSV: Yes No			Yes 🛛 No		
Fluid: Liquid	Fluid: Water Gas MW. 18 0152 C./C : 1 329			<sub>p</sub> /C <sub>v</sub> : 1.329	
Capacity R	Capacity Required: 45,036 lb/hr Density: 62.0 lb/ft <sup>3</sup> Viscosity: 0.674 cP			osity: 0.674	
	IENTS / ACCESSORIES isc Indicator: ⊠ Closed circuit □	Open Contact	Optical Clas	ss 1 Group B Div	
2				·	
Jack Sci	rows Cougo Top (1/2' on in	olot/outlot)	ell-tale Assembly		
	rews $\square$ Gauge Tap ( $\frac{1}{4}$ " on in embly Screws $\square$ Baffle Plate		m-tale Assembly		
	Dame Flate				
	LS OF CONSTRUCTION	T			
<b>Disc:</b> 316	SL SS	Holder: 316L	. 88		
Gaskets:		Flanges:			
Seal (for C	Composite):				
DOCUMEN	VTATION				
		With Bids	Approval	Certified	
Outline Din	nensional Drawings	2		2	

2

2

Literature & Parts List	2	2
Operating & Maintenance Instructions		2
Installation Instructions		2
Test & Inspection Reports		2
Material Certifications (CMTRs)		2
Code Certificate of Compliance		2
NOTES:		

Tag No.: R	D-2251 Moderators/Shutters/Inserts I	∟oop Filter	G.	Quantity Required: ONE	
Applicable	Applicable Code: ASME Code, Section VIII, Division 1				
	☐ Forward Acting ☐ Scored				
DISC	⊠ Reverse Acting	☐ Knife Blade			
Disc					
	Non-Fragmenting ☐ Sanitary	☐ Polymerizing	Service Com	posite	
	□ None   □ Insert   □ Bolted   □ Threaded   □ Union			Union	
HOLDER	Sanitary Flow Swe	eeps Disc			
	Line Size: 1 inches	•			
	Line Size: 1 menes				
DESIGN C	ONDITIONS				
Burst Pres	Burst Pressure: 150 PSIG Manufacturing Range: +0/-5%				
Burst Tem	perature: 366 °F	Vacuum Condi	Vacuum Conditions Inlet/Outlet: FV / -		
Static Back Pressure: 0 PSIG Built-up Back Pressure: HOLD PSIG			D PSIG		
Vessel MAWP 150 PSIG Normal Max Operating Pressure 135 PSIG			135 PSIG		
Service: Static Cyclic Installed Upstream of PSV: Yes No			Yes 🛛 No		
Fluid: Liquid	Water ⊠ Gas □	MW: 18.01	52 C	S <sub>p</sub> /C <sub>v</sub> : 1.329	
Capacity R	equired: 1,536 lb/hr	Density: 0.30	63 lb/ft <sup>3</sup> Visc	osity: 0.0156	
ATTACIDA	ENTE / ACCESSODIES				
Burst D	IENTS / ACCESSORIES isc Indicator: ☐ Closed circuit ☐	Open Contact	Optical Clas	ss 1 Group B Div	
2	_				
Jack Sc		let/outlet)	ell-tale Assembly		
☐ Pre-ass	embly Screws Baffle Plate				
MATERIALS OF CONSTRUCTION					
<b>Disc:</b> 316	Disc: 316L SS Holder: 316L SS				
Gaskets:		Flanges:			
Seal (for C	composite):				
DOGULES.	VITA ITION				
DOCUMEN	TATION	With Bids	Approval	Certified	
Outline Din	nensional Drawings	2	, , , , , , , , , , , , , , , , , , , ,	2	

Literature & Parts List	2	2
Operating & Maintenance Instructions		2
Installation Instructions		2
Test & Inspection Reports		2
Material Certifications (CMTRs)		2
Code Certificate of Compliance		2
NOTES:		•

Tag No.: R	Tag No.: RD-2252 Moderators/Shutters/Inserts Loop Drain Tank  H. Quantity Required: ONE				
Applicable	Applicable Code: ASME Code, Section VIII, Division 1				
	☐ Forward Acting ☐ Scored				
DISC	⊠ Reverse Acting	☐ Knife Blade			
			я . Па	•,	
	Non-Fragmenting ☐ Sanitary ☐ Polymerizing Service ☐ Composite			posite	
	None   ☑ Insert   ☐ Bolted   ☐ Threaded   ☐ Union			Union	
HOLDER	☐ Sanitary ☐ Flow Swe	eeps Disc			
		•			
	Line Size: 3/4 inches				
DESIGN C	ONDITIONS				
Burst Pressure: 150 PSIG Manufacturing Range: +0/-5%					
Burst Tem	perature: 366 °F	Vacuum Condi	Vacuum Conditions Inlet/Outlet: FV / -		
Static Back Pressure: 0 PSIG		Built-up Back F	Built-up Back Pressure: <b>HOLD</b> PSIG		
Vessel MA		Normal Max O	perating Pressure	135 PSIG	
Service: Static Cyclic Installed Upstream of PSV: Yes Static			Yes 🛛 No		
Fluid: Liquid	Fluid: Water S Gas MW 18 0152 C/C : 1 329			<sub>p</sub> /C <sub>v</sub> : 1.329	
Capacity Required: 1,372 lb/hr Density: cP			63 lb/ft <sup>3</sup> Visc	osity: 0.0156	
A TETT A CIVID A	VENTS / A GCESSOD VES	,			
	IENTS / ACCESSORIES isc Indicator: ☐ Closed circuit ☐	Open Contact	Optical Clas	ss 1 Group B Div	
2					
Jack Sci	rews Gauge Tap (1/4" on in	let/outlet) $\Box$ Te	ell-tale Assembly		
	sembly Screws Baffle Plate		tare rissembly		
MATERIALS OF CONSTRUCTION					
<b>Disc:</b> 316		Holder: 316l	_ SS		
Gaskets:		Flanges:			
	Composite):	<u> </u>			
	• •				
DOCUMEN	DOCUMENTATION				
0 (1) 5:		With Bids	Approval	Certified	
Outline Din	nensional Drawings	2		2	

2

2

Literature & Parts List	2	2
Operating & Maintenance Instructions		2
Installation Instructions		2
Test & Inspection Reports		2
Material Certifications (CMTRs)		2
Code Certificate of Compliance		2
NOTES:		

Tag No.: R	RD-2253 Moderators/Shutters/Inserts I	I.	Quantity Required: ONE		
Applicable	Applicable Code: ASME Code, Section VIII, Division 1				
	☐ Forward Acting ☐ Scored				
DISC		☐ Knife Blade			
Disc	The verse recting	I IIII Diude			
	Non-Fragmenting ☐ Sanitary	☐ Polymerizing	Service Com	posite	
	□ None □ Insert □ Bolted □ Threaded □ Union			Union	
HOLDER	OLDER Sanitary Flow Sweeps Disc				
	Line Size: 2 inches				
DESIGN CO	ONDITIONS				
Burst Pres		Manufacturing	Range: +0/-5%		
Burst Tem	perature: 306 °F	Vacuum Condi	Vacuum Conditions Inlet/Outlet: FV / -		
Static Back	R Pressure: 0 PSIG	Built-up Back F	Built-up Back Pressure: HOLD PSIG		
Vessel MA	WP 150 PSIG	Normal Max O	perating Pressure	52 PSIG	
Service: Pulsating	Static	Installed Upstre	eam of PSV:	Yes 🛛 No	
Fluid: Liquid	Fluid: Water Sas MW: 18 0152 C/C: 1 329			S <sub>p</sub> /C <sub>v</sub> : 1.329	
Capacity Required: 863 lb/hr Dens			68 lb/ft <sup>3</sup> Visc	osity: 0.0143	
A TETT A CILID	TENTES / A COESSODIES				
	IENTS / ACCESSORIES isc Indicator: ☐ Closed circuit ☐	Open Contact	Optical Clas	ss 1 Group B Div	
2		open contact	Option Old	50 1 Group B BIV	
			n. 1		
☐ Jack Sc	rews Gauge Tap (¼" on in sembly Screws Baffle Plate	let/outlet) Te	ell-tale Assembly		
	Barrier late				
MATERIAI	LS OF CONSTRUCTION				
<b>Disc:</b> 316	SL SS	Holder: 316l	Holder: 316L SS		
Gaskets:		Flanges:	Flanges:		
Seal (for C	Composite):				
DOCUMEN	JT A TION				
DOCUMEN	11111011	With Bids	Approval	Certified	
Outline Din	nensional Drawings	2		2	

2

2

Operating & Maintenance Instructions	
, ,	2
Installation Instructions	2
Test & Inspection Reports	2
Material Certifications (CMTRs)	2
Code Certificate of Compliance	2
NOTES:	

Tag No.: R	Tag No.: RD-2751 Reflector Plugs Loop G/L Separator  J. Quantity Required: ONE				
Applicable	Applicable Code: ASME Code, Section VIII, Division 1				
	☐ Forward Acting ☐ Scored				
DISC	⊠ Reverse Acting    □ Scored	☐ Knife Blade			
			g · □ g	•,	
	✓ Non-Fragmenting   ☐ Sanitary   ☐ Polymerizing Service   ☐ Composite			posite	
	☐ None ☐ Insert				
HOLDER	☐ Sanitary ☐ Flow Sw	eeps Disc			
	Line Size: 3 inches				
DESIGN CO	ONDITIONS				
Burst Press	sure: 70 PSIG	Manufacturing I	Range: +0/-5%		
Burst Temp	perature: 110 °F	Vacuum Condit	Vacuum Conditions Inlet/Outlet: FV / -		
Static Back	Pressure: 0 PSIG	Built-up Back P	Built-up Back Pressure: HOLD PSIG		
Vessel MAWP 150 PSIG Normal Max Operating Pressure 63 PSIG			63 PSIG		
Service: Static Cyclic Installed Upstream of PSV: Yes No			Yes 🛛 No		
Fluid: Heavy Water $\square$ Gas $\boxtimes$ MW: 20.031 $C_p/C_v$ : 1.32 Liquid			/C <sub>v</sub> : 1.32		
Capacity R	equired: 140,720 lb/hr	Density: 68.6 cP	i lb/ft <sup>3</sup> Visc	osity: 0.728	
ATTACIINA	TENITS / ACCESSODIES				
	IENTS / ACCESSORIES isc Indicator: ⊠ Closed circuit □	Open Contact	Optical Clas	ss 1 Group B Div	
☐ Jack Sci	rews Gauge Tap (1/4" on ir	olet/outlet)	ll-tale Assembly		
	embly Screws Baffle Plate		n-taic Assembly		
MATERIALS OF CONSTRUCTION					
	Disc: 316L SS Holder: 316L SS				
Gaskets:		Flanges:			
Seal (for C	composite):				
DOCUMEN	TATION	With Ride	Approval	Certified	
			2		

2

Literature & Parts List	2	2
Operating & Maintenance Instructions		2
Installation Instructions		2
Test & Inspection Reports		2
Material Certifications (CMTRs)		2
Code Certificate of Compliance		2
NOTES:		

Tag No.: RD-	-2752 Reflector Plugs	K . Quantity Required: ONE				
Applicable Code: ASME Code, Section VIII, Division 1						
☐ Forward Acting ☐ Scored						
DISC	<b>⊠</b> Reverse Acting	Scored [	☐ Knife Blade			
	<b>◯</b> Non-Fragmenting	☐ Sanitary	☐ Polymerizing Service ☐ Composite			
	None		☐ Bolted ☐ Threaded ☐ Union			
HOLDER Sanitary Flow Sweeps Disc						
L	Line Size: 1-1/2	inches				
DESIGN CONDITIONS						
Burst Pressur		SIG	Manufacturing Range: +0/-5%			
Burst Temper	rature: 367 °F	=	Vacuum Conditions Inlet/Outlet: FV / -			
Static Back Pressure: 0 PSIG			Built-up Back Pressure: HOLD PSIG			
Vessel MAWP 150 PSIG			Normal Max Operating Pressure 135 PSIG			
Service: Static Cyclic Dulsating			Installed Upstream of PSV: Yes No			
Fluid: F Liquid	Heavy Water	⊠ Gas □	MW: 20.031 C <sub>p</sub> /C <sub>v</sub> : 1.32			
Capacity Req	quired: 2,835	lb/hr	Density: 0.372 lb/ft <sup>3</sup> Viscosity: 0.0157 cP			
ATTACHMENTS / ACCESSORIES  Burst Disc Indicator: Class 1 Group B Div						
☐ Jack Screws ☐ Gauge Tap (1/4" on inlet/outlet) ☐ Tell-tale Assembly						
☐ Pre-assembly Screws ☐ Baffle Plate ☐						
MATERIALS OF CONSTRUCTION						
Disc: 316L SS			Holder: 316L SS			
Gaskets:			Flanges:			
Seal (for Composite):			-			
DOCUMENTATION						

	With Bids	Approval	Certified
Outline Dimensional Drawings	2		2
Operation & Performance Data	2		2
Literature & Parts List	2		2

Operating & Maintenance Instructions	2
Installation Instructions	2
Test & Inspection Reports	2
Material Certifications (CMTRs)	2
Code Certificate of Compliance	2
NOTES:	

Tag No.: RD-2753 Reflector Plugs Loop Drain Tank  L. Quantit Require ONE						
Applicable	Code: ASME Code, Section VIII, Div	vision 1				
	☐ Forward Acting ☐ Scored					
DISC	⊠ Reverse Acting    □ Scored	☐ Knife Blade				
Disc						
Non-Fragmenting ☐ Sanitary ☐ Polymerizing Service ☐ Composite						
	□ None	☐ Bolted ☐	Threaded	Union		
HOLDER	Sanitary Flow Sw	eeps Disc				
		•				
	Line Size: 1-1/2 inches					
DESIGN C	ONDITIONS					
Burst Pres		Manufacturing	Range: +0/-5%			
Burst Temperature: 70 °F Vacuum Conditions Inlet/C			ions Inlet/Outlet:	FV / -		
Static Back	Pressure: 0 PSIG	Built-up Back P	ressure: HOLI	D PSIG		
Vessel MA	WP 150 PSIG	Normal Max Op	erating Pressure	135 PSIG		
Service: Pulsating	Static	Installed Upstre	eam of PSV:	Yes 🛛 No		
Fluid: Liquid	Heavy Water ☐ Gas ☐	MW: 20.03	1 C <sub>p</sub> /	/C <sub>v</sub> : 1.32		
Capacity R	equired: 66,979 lb/hr	Density: 69.2 cP	2 lb/ft <sup>3</sup> Visc	osity: 1.227		
ATTACIDA	ENTS / ACCESSORIES					
	isc Indicator:   Closed circuit	Open Contact	Optical Clas	ss 1 Group B Div		
☐ Jack Sci	rews Gauge Tap (1/4" on ir	olet/outlet)	ell-tale Assembly			
	embly Screws Baffle Plate		ii-taic rissembly			
MATERIALS OF CONSTRUCTION						
<b>Disc:</b> 316		Holder: 316L	. SS			
Gaskets:		Flanges:				
Seal (for C	composite):					
D 0 0777 577	THE ATTACK					
DOCUMEN	TATION	With Bids	Approval	Certified		
Outline Din	nensional Drawings	2	Approvai Certilled 2			

2

Operation & Performance Data

Literature & Parts List	2	2
Operating & Maintenance Instructions		2
Installation Instructions		2
Test & Inspection Reports		2
Material Certifications (CMTRs)		2
Code Certificate of Compliance		2
NOTES:		

Tag No.: R	RD-9551 Ring Injection Beam Stop Lo	op Filter	М.	Quantity Required: ONE			
Applicable	Code: ASME Code, Section VIII, Div	vision 1					
• •	☐ Forward Acting ☐ Scored						
DISC	□ Reverse Acting □ Scored	☐ Knife Blade					
	□ None □ Insert □ Bolted □ Threaded □ Union						
HOLDER		eeps Disc					
HOLDER		ceps Disc					
	Line Size: <sup>3</sup> / <sub>4</sub> inches						
DESIGN CO	ONDITIONS						
Burst Pres	sure: 150 PSIG	Manufacturing	Range: +0/-5%				
Burst Tem	perature: 366 °F	Vacuum Cond	Vacuum Conditions Inlet/Outlet: FV / -				
Static Back	Pressure: 0 PSIG	Built-up Back I	Built-up Back Pressure: <b>HOLD</b> PSIG				
Vessel MA	WP 150 PSIG	Normal Max O	Normal Max Operating Pressure 135 PSIG				
Service: Pulsating	Static	Installed Upstr	Installed Upstream of PSV:  Yes  No				
Fluid: Liquid	Water ☐ Gas ☐	MW: 18.01	52 C	<sub>p</sub> /C <sub>v</sub> : 1.329			
Capacity R	lequired: 1,148 lb/hr	Density: 0.3 cP	63 lb/ft <sup>3</sup> Visc	osity: 0.0156			
A TETT A CIVID A	TENERS / A COURGE OF THE						
	IENTS / ACCESSORIES isc Indicator: ⊠ Closed circuit □	Open Contact	Optical Clas	ss 1 Group B Div			
2	ise indicator.	Open Contact	optical Olas	33 1 Gloup B BIV			
Jack Sc		<u>llet/outlet)                                   </u>	ell-tale Assembly				
☐ Pre-ass	embly Screws						
MATERIAI	LS OF CONSTRUCTION						
<b>Disc:</b> 316	Disc: 316L SS Holder: 316L SS						
Gaskets:		Flanges:					
Seal (for C	Composite):						
DOCUMEN	VTATION	With Bids	Approval	Certified			
Outline Din	nensional Drawings	2	Αμριοναί	2			

2

Operation & Performance Data

Literature & Parts List	2	2
Operating & Maintenance Instructions		2
Installation Instructions		2
Test & Inspection Reports		2
Material Certifications (CMTRs)		2
Code Certificate of Compliance		2
NOTES:		

Tag No.: RD-9552 Ring Injection Beam Stop Loop Drain Tank  Requi ONE							
Applicable	Code: ASME Code, Section VIII, Di	vision 1					
	☐ Forward Acting ☐ Scored						
DISC	□ Reverse Acting □ Scored	☐ Knife Blade					
	Non-Fragmenting ☐ Sanitary ☐ Polymerizing Service ☐ Composite						
	□ None □ Insert □ Bolted □ Threaded □ Union						
HOLDER	☐ Sanitary ☐ Flow Sw	reeps Disc					
	Line Size: 3/4 inches						
	Line Size: 5/4 menes						
F	ONDITIONS						
Burst Pres			Manufacturing Range: +0/-5%				
Burst Tem			Vacuum Conditions Inlet/Outlet: FV / -				
	k Pressure: 0 PSIG		Built-up Back Pressure: HOLD PSIG				
Vessel MA		Normal Max O	Normal Max Operating Pressure 135 PSIG				
Service: Pulsating	Static	Installed Upstr	eam of PSV:	Yes 🛛 No			
Fluid: Liquid	Water ☐ Gas ☐	MW: 18.01	52 C	<sub>p</sub> /C <sub>v</sub> : 1.329			
Capacity R	Required: 14,320 lb/hr	Density: 62.	3 lb/ft <sup>3</sup> Visc	osity: 0.976			
ATT ACUN	IENTS / ACCESSORIES						
Burst D	isc Indicator:	Open Contact	Optical Clas	ss 1 Group B Div			
2							
Jack Sc		nlet/outlet) <u> </u>	ell-tale Assembly				
☐ Pre-assembly Screws ☐ Baffle Plate ☐							
MATERIALS OF CONSTRUCTION							
Disc: 316L SS Holder: 316L SS							
Gaskets:		Flanges:					
	Composite):						
	,	l					
DOCUMEN	NTATION	-					
<u> </u>		With Bids	Approval	Certified			
Outline Dir	nensional Drawings	2		2			

2

Operation & Performance Data

Literature & Parts List	2	2
Operating & Maintenance Instructions		2
Installation Instructions		2
Test & Inspection Reports		2
Material Certifications (CMTRs)		2
Code Certificate of Compliance		2
NOTES:		

Tag No.: R	Tag No.: RD-9553 Ring Injection Beam Stop Loop G/L Separator  O. Quantity Required: ONE						
Applicable	Applicable Code: ASME Code, Section VIII, Division 1						
	☐ Forward Acting	Scored					
DISC	<b>⊠</b> Reverse Acting						
	Non-Fragmenting ☐ Sanitary ☐ Polymerizing Service ☐ Composite						
	☐ None	<b>⊠</b> Insert	☐ Bolted ☐	Threaded	Union		
HOLDER	☐ Sanitary	☐ Flow Sweep	s Disc				
	Line Size: 1	inches					
DESIGN CO	ONDITIONS						
Burst Press	sure: 150 P	SIG	Manufacturing	Range: +0/-5%			
Burst Temp	perature: 120 °	F	Vacuum Conditions Inlet/Outlet: FV / -				
Static Back	k Pressure: 0 P	SIG	Built-up Back F	Pressure: HOLI	D PSIG		
Vessel MA	.WP 150 F	PSIG	Normal Max O	perating Pressure	135 PSIG		
Service: Pulsating	⊠ Static ☐ Cycli	ic 🗌	Installed Upstre	eam of PSV:	Yes 🛛 No		
Fluid: Liquid	Water	☐ Gas 🗵	MW: 18.01		<sub>p</sub> /C <sub>v</sub> : 1.329		
Capacity R	Required: 24,422	lb/hr	Density: 61.7	7 lb/ft <sup>3</sup> Visc	osity: 0.557		
ATTACHM	IENTS / ACCESSORIES						
⊠ Burst D 2	isc Indicator: 🛛 Close	ed circuit	pen Contact	Optical Clas	ss 1 Group B Div		
☐ Jack Sci	rews Gauge	Tap (¼" on inlet	/outlet)	ell-tale Assembly			
☐ Pre-ass	sembly Screws 🔲 E	Baffle Plate [					
MATERIALS OF CONSTRUCTION							
<b>Disc:</b> 316	Disc: 316L SS Holder: 316L SS						
Gaskets:			Flanges:				
Seal (for C	Composite):						
,			l				
DOCUMEN	NIAIION	T	With Bids	Approval	Certified		
Outline Din	nensional Drawings		2	πρριοναι	2		
	& Performance Data		2		2		

Literature & Parts List	2	2
Operating & Maintenance Instructions		2
Installation Instructions		2
Test & Inspection Reports		2
Material Certifications (CMTRs)		2
Code Certificate of Compliance		2
NOTES:		

DATA SHEET	DATA SHEET NO. 106060000-DS- A004-R00	REV.	ISSUE DATE
	PAGE 1 OF 1	REQUISI	TION NO.
	PROCURED BY	INSTALL	ED BY
PROJECT TITLE Spallation Neutron Source	PROJECT NO.	CSO OR	WO
JOB TITLE TARGET AND DUMP BUILDINGS	BUILDING	PLANT	
EQUIPMENT: EQUIPMENT Check Valves	E ATTACHMENT C		

Suggested Model: <u>Durabla Excalibur Series</u>

TOTAL QUANTITY REQUIRED See Attachment C for equipment listing

### PERFORMANCE:

Flowing medium <u>Water</u>
Style <u>Center Guided Spring</u>
Operating Pressure,psig <u>250</u>
End Connections <u>Butt Weld</u>
Service Temperature Max <u>200 F</u>
Internal Gasket Material <u>Flexible Graphite</u>
Seat Material Metal to Metal

#### ACCESSORIES:

Adjustable Spring resistance rate Yes

#### CONSTRUCTION:

Casing Material 316L SS PAINTING: N/A

A. NOTE: 1. Check Valve shall be manufactured of 316L SS as identified in specification section 15130

Furnish the following manufacturer's data in quantities indicated	NUMBER OF C	OPIES		Type of Data (Continued)	NUMBER OF COPIES			
quantities indicated	W'Bids	Approva1	Certified	(Continued)	W' Bids	Approva1	Cert	
1 Outline Dimensional Drawings		2	2	6 Wiring Diagram				
2 Operation & Performance Data			2	7 Completed Data Sheet	2			
3 Literature & Parts List			2					
4 Operating & Maint. Instructions			2					
5 Installation Instructions			2					
PREPARED BY	APPROVED BY			PRINCIPAL ENGINEER	PROJECT ENG	R. MANAGER		

NOTE: SPACE MARKED WITH AN ASTERISK (\*) INDICATES BIDDER TO FURNISH THE INFORMATION

DATA SHEET	DATA SHEET NO. 106060000-DS- A005-R00	REV.	ISSUE DATE
	PAGE 1 OF 1	REQUISI	TION NO.
	PROCURED BY	INSTALL	ED BY
PROJECT TITLE Spallation Neutron Source	PROJECT NO.	CSO OR	WO
JOB TITLE TARGET AND RING BUILDINGS	BUILDING	PLANT	
Flexible Hoses EQUIPMENT (SEE ATTCH			

Suggested Model: American Boa  $\underline{\text{M/N PARRAPP}}$  TOTAL QUANTITY REQUIRED SEE ATTACHMENT C FOR EQUIPMENT LISTING PERFORMANCE:

Flowing medium <u>Water</u>
Style <u>Bellows with Braided outer Covering</u>
Operating Pressure, psig <u>250</u>
End Connections <u>Butt Weld</u>
Service Temperature Max <u>200 F</u>

<u>Size</u>	<u>OA Lengtn</u>	<u>Dynamic Bend Radius</u>	(min) Static Bend Radius (min)
1.5"	16"	10.0 inches	3.9 inches
2.0"	24"	11.5 inches	4.7 inches
3.0"	24"	15.35 inches	7.0 inches

ACCESSORIES:

Internal Bellows Liner No

CONSTRUCTION:

Bellows Material  $\underline{316L~SS}$  Braid Material  $\underline{316L~SS}$  Butt Weld End Connections Material  $\underline{316L~SS}$ 

# B. NOTE: 1. Flex Hose shall be manufactured of 316L SS as identified in specification section 15130

Furnish the following manufacturer's data in quantities indicated	NUMBER OF COPIES			Type of Data (Continued)	NUMBER OF COPIES		
	W' Bids	Approva1	Certified	(continued)	W' Bids	Approva1	Cert
1 Outline Dimensional Drawings		2	2	6 Wiring Diagram			
2 Operation & Performance Data			2	7 Completed Data Sheet	2		
3 Literature & Parts List			2				
4 Operating & Maint. Instructions			2				
5 Installation Instructions			2				
PREPARED BY	APPROVED BY			PRINCIPAL ENGINEER	PROJECT ENGR. MANAGER		

NOTE: SPACE MARKED WITH AN ASTERISK (\*) INDICATES BIDDER TO FURNISH THE INFORMATION

DATA SHEET	DATA SHEET NO. 106060000-A003- R00	REV.	ISSUE DATE
	PAGE 1 OF 1	REQUISI'	TION NO.
	PROCURED BY	INSTALL	ED BY
PROJECT TITLE Spallation Neutron Source	PROJECT NO.	CSO OR	WO
JOB TITLE Ring Injection Dump Bldg	BUILDING	PLANT	
EQUIPMENT NO Globe Valves - Manual ¾" and smaller SEE ATTACHMENT O			

Suggested Models: Swagelok SS-4BRW-TW, SS-4BMRW-TW, SS-BBG-TW

TOTAL QUANTITY REQUIRED SEE ATTACHMENT C FOR EQUIPMENT LISTING

#### PERFORMANCE:

Flowing medium Water

Cv (min) MFG Recommendations for models identified Operating Pressure, psig 250End Connections Butt Weld or Swaqelok as identified Service Temperature Max 200 F

Seal Material Bellows Seal 316L

Seat Material mfg standard for models identified Flow Direction Under the Seat Maximum Height, inches 4-3/16"

#### ACCESSORIES:

Bellows Seal Yes Bellows Material 316L SS
Operator Hand wheel or Knurled Metering knob

#### CONSTRUCTION:

Casing Material 316L SS

NOTE: 1. Valve shall be manufactured of 316L SS as identified in specification section 15130

Furnish the following manufacturer's data in quantities indicated	NUMBER OF COPIES			Type of Data	NUMBER OF COPIES		
	W' Bids	Approval	Certified	(Continued)	W' Bids	Approval	Cert
1 Outline Dimensional Drawings		2	2	6 Wiring Diagram			
2 Operation & Performance Data			2	7 Completed Data Sheet	2		
3 Literature & Parts List			2				
4 Operating & Maint. Instructions			2				
5 Installation Instructions			2				
PREPARED BY	APPROVED BY			PRINCIPAL ENGINEER	PROJECT ENGR. MANAGER		

NOTE:SPACE MARKED WITH AN ASTERISK(\*) INDICATES BIDDER TO FURNISH THE INFORMATION